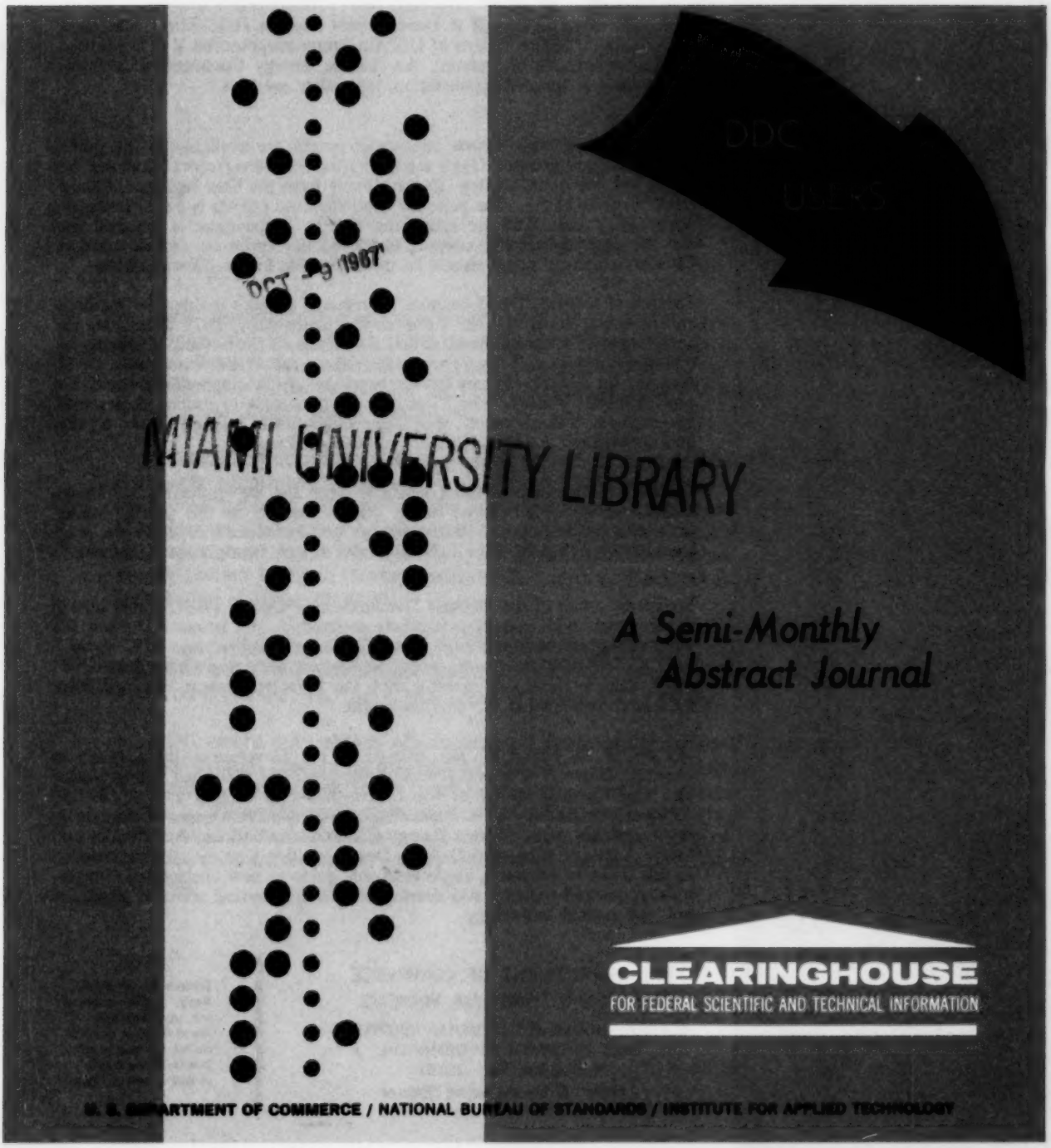
C 41. 21: 67/18

September 25, 1967

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS



U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

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INDEX

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U.S. DEPARTMENT OF COMMERCE
Alexander B. Trowbridge, Secretary

CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
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Hubert E. Sauter, Acting Director

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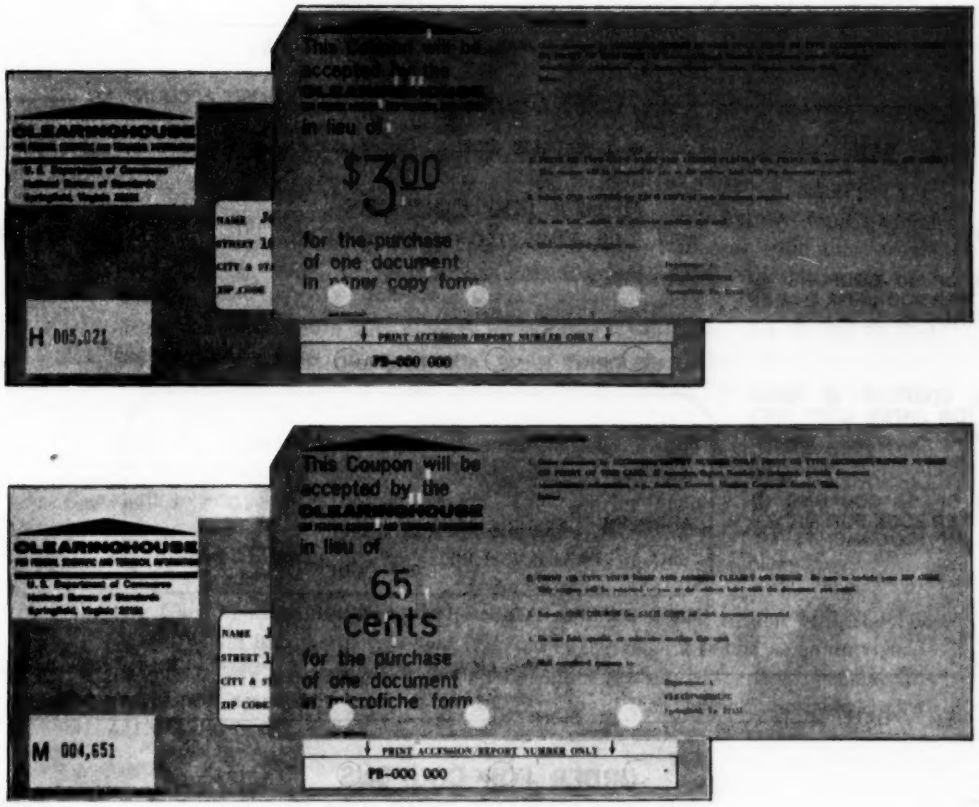
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FOREWORD

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS is produced by computer from machineable records generated by four Federal agencies which announce R&D reports. Machineable records from the Atomic Energy Commission, the National Aeronautics and Space Administration, the Defense Documentation Center and the Clearinghouse for Federal Scientific and Technical Information are merged to produce USGRDR. All of the reports announced in USGRDR are indexed in the companion index, GOVERNMENT-WIDE INDEX TO FEDERAL RESEARCH & DEVELOPMENT REPORTS.

There are some format errors and inconsistencies in this journal resulting from the machine merger of the data generated by several agencies. Efforts are being made to correct these inconsistencies. The agencies involved are working with a task group of the Committee on Scientific and Technical Information to develop improved interagency standards which will eliminate these problems.

The Clearinghouse is striving to improve the content and format of USGRDR so that it will become increasingly valuable to the general public as an announcement tool and order guide. Comments and suggestions for improvement are invited and should be directed to the Director, Clearinghouse, Springfield, Va. 22151.

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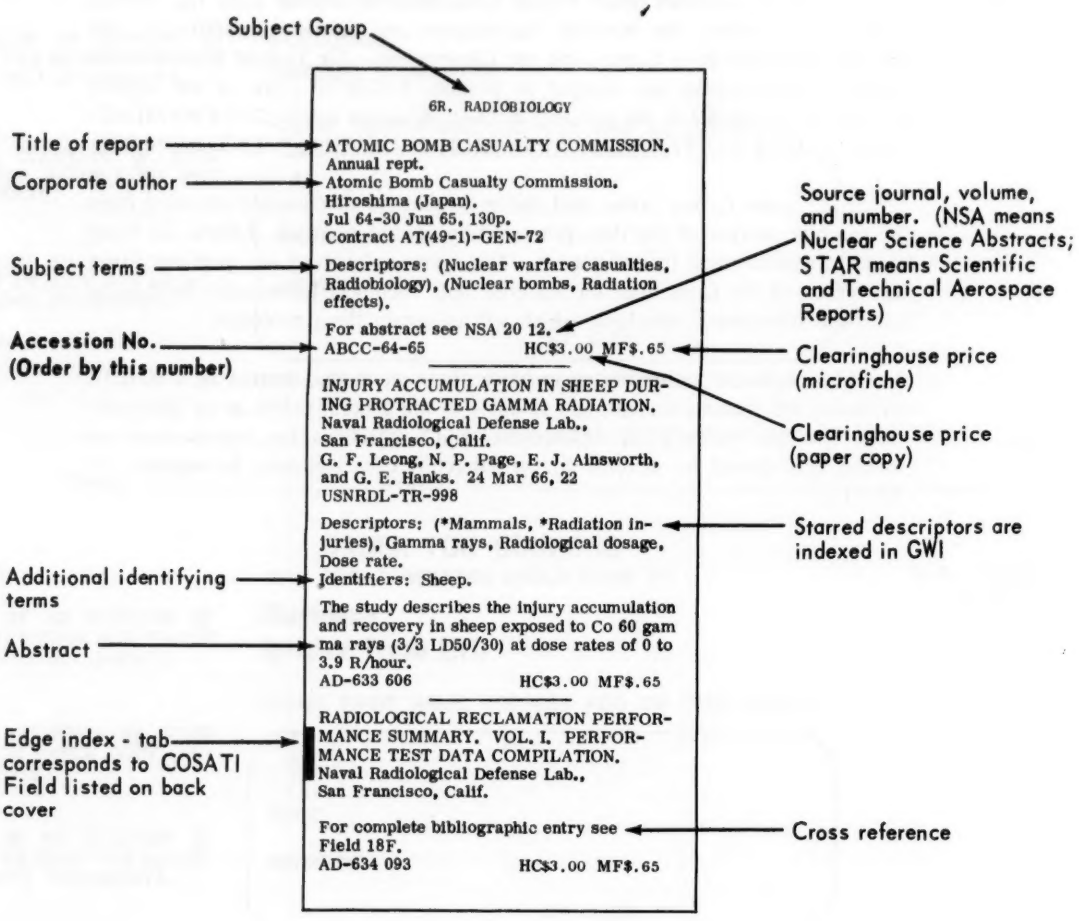
Reports are announced under 22 subject categories called FIELDS. Each FIELD is divided into subcategories called GROUPS. Documents are listed alphanumerically by accession number within the GROUP. This classification system was adopted by the Committee on Scientific and Technical Information (COSATI). The *COSATI Subject Category List* (AD 612 200) is available from the Clearinghouse at $3.00.

SAMPLE JOURNAL ENTRIES


Subject Group
6R. RADIOBIOLOGY
Title of report
ATOMIC BOMB CASUALTY COMMISSION. Annual rept.
Corporate author
Atomic Bomb Casualty Commission. Hiroshima (Japan).
Jul 64-30 Jun 65, 130p.
Contract AT(49-1)-GEN-72
Subject terms
Descriptors: (Nuclear warfare casualties, Radiobiology), (Nuclear bombs, Radiation effects).
Source journal, volume, and number. (NSA means Nuclear Science Abstracts; STAR means Scientific and Technical Aerospace Reports)
For abstract see NSA 20 12.
Accession No. (Order by this number)
ABCC-64-65 HC$3.00 MF$.65
Clearinghouse price (microfiche)
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INJURY ACCUMULATION IN SHEEP DURING PROTRACTED GAMMA RADIATION.
Naval Radiological Defense Lab., San Francisco, Calif.
G. F. Leong, N. P. Page, E. J. Ainsworth, and G. E. Hanks. 24 Mar 66, 22
USNRDL-TR-998
Descriptors: (*Mammals, *Radiation injuries), Gamma rays, Radiological dosage, Dose rate.
Starred descriptors are indexed in GWI
Additional identifying terms
Identifiers: Sheep.
Abstract
The study describes the injury accumulation and recovery in sheep exposed to Co 60 gamma rays (3/3 LD50/30) at dose rates of 0 to 3.9 R/hour.
AD-633 606 HC$3.00 MF$.65
Edge index - tab corresponds to COSATI Field listed on back cover
RADIOLOGICAL RECLAMATION PERFORMANCE SUMMARY. VOL. I. PERFORMANCE TEST DATA COMPILATION.
Naval Radiological Defense Lab., San Francisco, Calif.
For complete bibliographic entry see Field 18F.
Cross reference
AD-634 093 HC$3.00 MF$.65

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SUBJECT CATEGORY HEADINGS

Use Edge Index on back cover to locate COSATI Field in journal

COSATI FIELD

01 AERONAUTICS

Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE

Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS

Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES

Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES

Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES

Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

07 CHEMISTRY

Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.

08 EARTH SCIENCES AND OCEANOGRAPHY

Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes components; computers; electronic and electrical engineering; information theory; subsystems; and telemetry.

10 ENERGY CONVERSION (Non-Propulsive)

Includes conversion techniques; power sources; and energy storage.

COSATI FIELD

11 MATERIALS

Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES

Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction equipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT

Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES

Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY

Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY

Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear powerplants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

19 ORDNANCE

Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS

Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS

Includes air-breathing engines; combustion and ignition; electric propulsion; fuels; jet and gas turbine engines; nuclear propulsion; reciprocating engines; rocket motors and engines; and rocket propellants.

22 SPACE TECHNOLOGY

Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

RESEARCH highlights

Reports of current high industrial interest

Highlighted documents, unless otherwise designated, are sold at the new unit price of $3.00 each, 65 cents microfiche.

Categories

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Transportation (Land, Sea, Air, Space)	ix
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Transportation (Land, Sea, Air, Space)

A STUDY TO DETERMINE THE FEASIBILITY OF APPLYING COMPUTER TECHNOLOGY TO THE STORAGE AND RETRIEVAL OF TARIFF INFORMATION on file with the Interstate Commerce Commission has been completed by the Battelle Memorial Institute for the U. S. Department of Transportation. In Phase I of the study the general logic is developed and algorithms are formulated for storing and retrieving tariff data on origin and destination, commodity description, mode, carrier, and related data needed to determine applicable rates. (Phase I is available from the Clearinghouse in two separate volumes, PB-170 590 and PB-170 591.)

Phase II of the study involves the development of algorithms for accessorial charges, for footnotes, rules and regulations, and for the storage and retrieval of routing data. These last algorithms are manually tested and made an integral part of the general logic of tariff storage and retrieval. Also in Phase II the primary question of the technical feasibility of a complete system for computer storage and retrieval of tariff information is resolved both for laboratory conditions and for the general or broad conditions which will govern prospective users. ORDER . . . . . PB-175 706 -- FEASIBILITY OF COMPUTER STORAGE AND RETRIEVAL OF FREIGHT TARIFF INFORMATION-- PHASE II. . . . . Battelle Memorial Inst., Columbus, Ohio, for U. S. Dept. of Transportation, May 67, 323p.

MANY CONCEPTS OF V/STOL AIRCRAFT studied during the past decade have led to the development of flying prototypes ranging from research aircraft to sophisticated second-generation models suitable for operational evaluation. Among the more favorable designs that have emerged from this work are those that involve helicopter-type aircraft which can be converted in flight to a more conventional configuration. V/STOL technology has now reached the point of development where the application of these V/STOL aircraft to civil transportation can be evaluated with a reasonable degree of confidence.

Five VTOL and two STOL short-haul transports have been analyzed by The Boeing Company in order to determine those most suitable for commercial short-haul operation and the research required to bring them to full operational status. The VTOL concepts studied were the tilt wing, jet lift, stowed-rotor helicopter, and the tip-turbine lift-fan aircraft. The STOL types studied were the fan-in-wing and the high-lift turbofan. The report of the study covers airplane design, operational techniques, noise and public acceptance, acquisition cost, direct operating cost, technical risk, and research requirement. ORDER. . . . . N67-28369 -- FEASIBILITY OF V/STOL CONCEPTS FOR SHORT-HAUL TRANSPORT AIRCRAFT . . . . . B. L. Fry and J. M. Zabinsky, The Boeing Co., Morton, Pa., for NASA, May 67, 181p.

THE VALUE OF TIME has become one of the most important parameters in the economic analysis of highway improvement proposals. However, the most common value ($0.86 per person-hour) can be justified only in that it represents current opinion of a logical and practical value, and even the latest studies have been unsuccessful in determining values that can be used with confidence in a variety of situations.

Recognizing the importance of the value-of-time factor, the Bureau of Public Roads contracted with Stanford Research Institute to undertake a research program whose overall objectives were to: (1) conduct a thorough review of the history of research on the value of time, (2) explore the theoretical problems encountered in establishing values of time for use in highway economy studies, (3) conduct experimental analyses leading to estimates of the value of time, and (4) develop mathematical models that can be used to derive value-of-time estimates for specific situations. The first volume of the final report of this program is now available from the Clearinghouse. ORDER. . . . . PB-175 653 -- THE VALUE OF TIME FOR PASSENGER CARS: A THEORETICAL ANALYSIS AND DESCRIPTION OF PRELIMINARY EXPERIMENTS, FINAL REPORT, VOLUME I. . . . . D. G. Haney (Comp.), Stanford Research Inst., Menlo Pk., Calif., for the Bureau of Public Roads, May 67, 172p.

Communications

SYNCOM III was launched on August 19, 1964, and placed into a nominally synchronous equatorial (stationary) orbit over the International Date Line. The attainment of a stationary orbit, which permits the use of fixed ground antennas rather than expensive tracking systems, and Syncom III's excellent performance in the televising of the 1964 Summer Olympic Games from Tokyo indicate the operational and economic feasibility of the synchronous communication satellite.

The second volume of a two-volume report on the Syncom Satellite System is now available from the Clearinghouse. This volume contains descriptions of the launch of the Syncom III satellite, its performance during the first 100 days of orbit, the televising of the 1964 Olympic Games, and the various communications tests conducted with it. Volume I of this report is still available; it contains descriptions of the satellite itself, the communications ground stations, and the telemetry and control ground stations. Volume I also covers the operation and performance of each of the Syncom subsystems. ORDER:

N67-25044 -- SYNCOM ENGINEERING REPORT, VOLUME II, Syncom Projects Office, Goddard Space Flight Center, Greenbelt, Md., Apr. 67, 200p.

N66-21691 -- Same Title. VOLUME I, Mar. 66, 165p.

Control Systems and Instrumentation

THE OCULOMETER, an instrument that makes it possible for man to control a machine by eye, rather than by conventional manual methods, has been developed at the Honeywell Radiation Center to the stage of an engineering feasibility breadboard.

The practical implementation of eye control requires a device that can measure the direction of pointing of the eye in two dimensions and in real time, and that can be used under operational, as distinct from laboratory, conditions. Specifically, the device should interfere as little as possible with the normal activities of a subject. None of the eye-measuring techniques presently known can be considered entirely satisfactory for such operational use. The oculometer was developed in order to fulfill this requirement.

In addition to its intended use for eye control of machines, the oculometer may find application simply as a measuring device with no control action involved. The oculometer's ease of operation and minimum interference with a subject could make possible more extensive use of eye-direction measurements for research, physiological and psychological monitoring, and diagnosis.

A report has been published that describes the oculometer, its design, fabrication, and testing, and the modifications that resulted from these tests. ORDER. . . . . N67-31481 -- THE OCULOMETER. . . . . J. Merchant, Honeywell, Inc., Boston, Mass., for NASA, July 67, 168p.

Information Technology

EMPIRICAL INFORMATION ON HUMAN RELEVANCE ASSESSMENT has been defined in a project conducted by the System Development Corporation. The work, which was supported by the National Science Foundation, was conducted over a two-year period and involved fifteen individual studies.

Evidence was discovered suggesting that relevance judgments are influenced by the following factors: (1) the skills and attitudes of the particular judges used, (2) the documents and document sets used, (3) the particular information requirement statements, (4) the instructions and setting in which the judgments take place, (5) the concepts and definitions of relevance employed in the judgments, and (6) the type of rating scale or other medium used to express the judgments. These findings cast doubt on the wisdom of treating relevance scores as stable criteria for system or subsystem evaluation in those instances where the six sources of variation just cited have not been recognized and properly controlled.

The first two volumes of the final report of the project are now available from the Clearinghouse; the third and last volume will be available in the near future. ORDER:

PB-175 518 -- EXPERIMENTAL STUDIES OF RELEVANCE JUDGMENTS: FINAL REPORT, VOLUME I, PROJECT SUMMARY, System Development Corp., Santa Monica, Calif., for NSF, June 67, 125p.

PB-175 517 -- Same Title. VOLUME II, DESCRIPTION OF INDIVIDUAL STUDIES, 131p.

Mathematics

AN UNCERTAIN DYNAMIC SYSTEM can be controlled in an optimal manner if a controller is used to minimize a performance index. The reasonable controller structures for a given system often can be determined by the designer in terms of a number of free parameters. For each structure, therefore, it is necessary to find and use those parameters which will yield the best system performance.

A report published recently by the University of Illinois presents minimax methods for determining such controller parameters. The report contains a new algorithm for solving minimax problems regardless of the presence of a saddle point; and this algorithm is extended to include the case of time-varying minimizing parameters. A method of obtaining multi-point optimality with time-varying parameters is demonstrated. This method is of particular value when the computational difficulties of finding minimax time-varying parameters are prohibitive. The report also presents several examples which illustrate the utility and practicality of the methods developed. ORDER. . . . . AD-656 450 -- MINIMAX CONTROLLER DESIGN . . . . . D. M. Salmon, Univ. of Illinois, Urbana, for the Coordinated Science Laboratory, July 67, 113p.

RESEARCH & DEVELOPMENT REPORTS

1. AERONAUTICS

1A. Aerodynamics

A THEORY FOR THE SLIP-FLOW BOUNDARY CONDITIONS OVER A SURFACE DEFINED BY ARBITRARY GAS-SURFACE INTERACTION PARAMETERS,
Cornell Univ Ithaca N Y
For primary bibliographic entry see Field 20D.
AD-655 195 Not available from CFSTI.

SIMPLE CLASSICAL MODEL FOR THE SCATTERING OF GAS ATOMS FROM A SOLID SURFACE: ADDITIONAL ANALYSES AND COMPARISONS,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20D.
AD-655 211 Not available from CFSTI.

POWERED MODEL INVESTIGATION OF THE EFFECTS OF GATED SPOILERS ON THE AERODYNAMIC CHARACTERISTICS OF WINGS AT ANGLES OF ATTACK FROM 0 TO 90 DEGREES,
Naval Ship Research and Development Center Washington D C Aerodynamics Lab
For primary bibliographic entry see Field 20D.
AD-655 248 HC$3.00 MF$0.65

ROTOR AIR LOADS, BLADE MOTION, AND STRESS CAUSED BY TRANSIENT INPUTS OF SHAFT TORQUE AS RELATED TO STOPPABLE ROTOR OPERATION,
Cornell Aeronautical Lab Inc Buffalo N Y
For primary bibliographic entry see Field 20D.
AD-655 268 HC$3.00 MF$0.65

AERODYNAMIC EXPERIMENTS ON AIRCRAFT,
Foreign Technology Div Wright-Patterson AFB Ohio
Meu-sing Liu. 31 Jan 67, 11p Rept no. FTD-TT-65-1824
TT-67-62356
Edited trans. of Hang K'ung Chih Shih (Chinese People's Republic), n4 p28-30 1964.

Descriptors: (*Aircraft, *Aerodynamics), Aeronautics, Force (Mechanics), Test methods, Wind tunnels, Airplane models, Pilots, Experimental data, China.

A non-technical article is presented explaining the usefulness and importance of aerodynamic experimentation. The paper gives general descriptions of the domains of aerodynamic experiments and the approaches to the measurement of aerodynamic forces. In discussing the methods for carrying out the experimental studies, the report gives brief descriptions of several modern research tools and techniques which include wind tunnels, pilotless electronic-controlled flying models, rocket trains and test pilot flying experiments.
AD-655 357 HC$3.00 MF$0.65

NEWS OF INSTITUTIONS OF HIGHER LEARNING. AERONAUTICAL ENGINEERING: No. 1 1964, COLLECTION OF ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1B.
AD-655 358 HC$3.00 MF$0.65

THE FLOW FIELD AND HEAT TRANSFER DOWNSTREAM OF A REARWARD FACING STEP IN SUPERSONIC FLOW,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-655 370 HC$3.00 MF$0.65

TRANSONIC FLOWS IN THE NEIGHBORHOOD OF A POINT WHERE A SHOCK WAVE MEETS THE SONIC LINE.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 20D.
AD-655 457 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF THE TURBULENT BOUNDARY LAYER BEHIND A FORWARD FACING STEP IN SUPERSONIC FLOW,
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 20D.
AD-655 462 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF A SIMPLIFIED METHOD FOR MEASURING HEAT TRANSFER AT SUPERSONIC SPEEDS,
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 20D.
AD-655 463 HC$3.00 MF$0.65

ON COMPUTATION OF FLOW PATTERNS OF COMPRESSIBLE FLUIDS IN THE TRANSONIC REGION.
Stanford Univ Calif Dept of Computer Science
For primary bibliographic entry see Field 20D.
AD-655 472 HC$3.00 MF$0.65

ANGLE-OF-ATTACK DISTRIBUTION OF A HIGH SPEED HELICOPTER ROTOR.
Massachusetts Inst of Tech Cambridge Aeroelastic and Structures Research Lab
For primary bibliographic entry see Field 20D.
AD-655 476 Not available from CFSTI.

AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF ELECTRICALLY INDUCED CONTROLLED FREQUENCY PERTURBATIONS ON BOUNDARY LAYER TRANSITION.
Ohio State Univ Research Foundation Columbus
For primary bibliographic entry see Field 20D.
AD-655 526 HC$3.00 MF$0.65

BOUNDARY LAYER OVER A THIN NEEDLE.
Minnesota Univ Minneapolis
For primary bibliographic entry see Field 20D.
AD-655 558 Not available from CFSTI.

A NUMERICAL SOLUTION OF THE BOLTZMANN EQUATION FOR A TWO-DIMENSIONAL GAS,
California Univ Berkeley Div of Aeronautical Sciences
For primary bibliographic entry see Field 20D.
AD-655 647 HC$3.00 MF$0.65

ANALYSIS AND USER'S MANUAL FOR IMPLICIT FINITE-DIFFERENCE COMPUTER PROGRAM FOR LAMINAR COMPRESSIBLE BOUNDARY LAYER CALCULATIONS.
General Applied Science Labs Inc Westbury N Y
For primary bibliographic entry see Field 20D.
AD-655 681 HC$3.00 MF$0.65

SOUND GENERATION BY SHOCK-VORTEX INTERACTION,
Syracuse Univ N Y
For primary bibliographic entry see Field 20A.
AD-655 713 Not available from CFSTI.

PRACTICAL ASPECTS OF CALCULATING SKIN FRICTION COEFFICIENTS BY COLE'S THEORY OF COMPRESSIBLE TURBULENT FLOWS,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 20D.
AD-655 766 HC$3.00 MF$0.65

ACOUSTIC ENERGY FLUX FROM SHOCK-TURBULENCE INTERACTION.
Toronto Univ (Ontario) Inst for Aerospace Studies
For primary bibliographic entry see Field 20A.
AD-655 795 HC$3.00 MF$0.65

INVERSE COMPUTATION OF SUPERSONIC INVISCID FLOW FIELDS WITH IMBEDDED SHOCKS: ANALYSIS AND USER'S MANUAL.
General Applied Science Labs Inc Westbury N Y
For primary bibliographic entry see Field 20D.
AD-655 806 HC$3.00 MF$0.65

ON THE DIFFERENTIAL EQUATION APPROXIMATION IN RADIATIVE GAS DYNAMICS.
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20M.
AD-655 813 HC$3.00 MF$0.65

A DESCRIPTION OF FOUR WIND-TUNNEL DYNAMIC MEASURING TECHNIQUES.
David Taylor Model Basin Washington D C Aerodynamics Lab
For primary bibliographic entry see Field 14B.
AD-655 825 HC$3.00 MF$0.65

AERODYNAMIC BEHAVIOR OF HYPERBOLOIDAL ANTENNA STRUCTURES.
Naval Academy Annapolis Md Dept of Engineering
For primary bibliographic entry see Field 9E.
AD-655 832 HC$3.00 MF$0.65

SPACE-TIME CORRELATIONS OF VELOCITY AND PRESSURE AND THE ROLE OF CONVECTION FOR HOMOGENEOUS TURBULENCE IN THE UNIVERSAL RANGE.
Trg Inc Melville N Y
For primary bibliographic entry see Field 20D.
AD-655 841 HC$3.00 MF$0.65

INVESTIGATIONS OF FLOWS ABOUT MODELS OF AERODYNAMIC BODIES IN A HYDRAULIC ANALOGY TANK.
Untersuchungen Von Stromungen Um Modelle Aerodynamischer Flugkorper in Einer Wasseranalogie-anlage
Deutsche Forschungsanstalt Fuer Luft- Und Raumfahrt, Stuttgart (West Germany).
G. Niehus. Sep 67, 106p DLR-FB-66-89
in German, English Summary

Descriptors: *Aerodynamic characteristics, *Flow pattern, *Hydraulic analogy, *Supersonic flow, *Transonic flow, Aerodynamic, Analogy, Characteristics, Configuration, Flow, Forebody, Hydraulic, Model, Pattern, Simulation, Supersonic, Table, Tank, Transonic, Water.

For abstract, see STAR 05 17.
N67-30446 HC$3.00 MF$0.65

CONTRIBUTION TO THE THEORY OF FLOWS INCLUDING CHEMICAL REACTIONS.
Contribution A La Theorie des Ecoulements Avec Reactions Chimiques
France. Office National D Etudes Et de Recherches Aeronautiques, Chatillon-sous-bagneux.
E. Larisch. 1966, 74p ONERA-PUBL.-114/1966/
in French, English Summary

Descriptors: *Chemical reaction, *Flow theory, *Reaction time, Asymptote, Boundary, Chemical, Fast, Flow, Freezing, Layer, Nozzle, Reaction, Shock, Slow, Theory, Thickness, Time, Viscosity.

For abstract, see STAR 05 17.
N67-30553 HC$3.00 MF$0.65

NON-IDEAL MGD FLOWS IN BOUNDARY LAYER APPROXIMATION.
Innsbruck Univ. (Austria). Inst. for Theoretical Physics.
For primary bibliographic entry see Field 20I.
For abstract, see STAR 05 17.
N67-30657 HC$3.00 MF$0.65

HEAT-TRANSFER MEASUREMENTS ON THE ROTOR BLADE OF A ROTOR ENTRY VEHICLE MODEL.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A. D. Levin, and R. C. Smith. Jul 67, 24p NASA TN-D-4065

Descriptors: *Aerodynamic heat transfer, *Reentry vehicle, *Rotor blade, Aerodynamic, Angle, Attack, Blade, Blunt, Body, Heat transfer, Heating, Impingement, Model, Rate, Reentry, Rotor, Shock, Vehicle, Wake.

For abstract, see STAR 05 17.
N67-30684 HC$3.00 MF$0.65

HEAT TRANSFER MEASUREMENTS ON A LOW-FINENESS- RATIO CYLINDER AT A MACH NUMBER OF 10.4 AND ANGLES OF ATTACK FROM 0 DEG TO 90 DEG.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
P. E. Everhart. Jul 67, 34p NASA-TM-X-1400
Contract 124-07-01-39-23

Descriptors: *Aerodynamic heat transfer, *Angle of attack, *Fineness ratio, *Free stream, *Hypersonic speed, Aerodynamic, Capsule, Cylinder, Diameter, End, Fineness, Flat, Flow, Free, Fuel, Heat transfer, Hypersonic, Low, Mach number, Nimbus satellite, Pattern, Ratio, Reynolds number, Speed, Stream.

For abstract, see STAR 05 17.
N67-30743 HC$3.00 MF$0.65

THRUST-LIFT INTEGRATION AND ITS CONSEQUENCES ON THE ECONOMY OF ATMOSPHERIC FLIGHT AT HIGH SPEED.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 21A.
For abstract, see STAR 05 17.
N67-30909 HC$3.00 MF$0.65

FULL-SCALE INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A MODEL EMPLOYING A SAILWING CONCEPT.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 17.
N67-31143 HC$3.00 MF$0.65

1B. Aeronautics

DEVELOPMENT OF ALL WEATHER LANDING SYSTEM RELIABILITY ANALYSIS AND CRITERIA FOR CATEGORY III AIRBORNE SYSTEMS, PHASE III, VOLUME I.
Summary rept.,
Lockheed-Georgia Co Marietta
L. A. Adkins, J. D. St. Clair, M. C. Thatro, and H. R. Willis. May 67, 205p Rept no. ER-8957-Vol-1
FAA-RD-67-20-Vol-1
Contract FA-65-WA-1376
See also AD-655 241, Volume 2.

Descriptors: (*Navigational aids, Airborne), (*Aircraft landings, *All-weather aviation), (*Aviation accidents, *Aviation safety), Reliability, Instrument landings, Human engineering, Mathematical models, Computer programs, Probability.

The Phase III, Volume I, report presents the results of a study program on Category III airborne All Weather Landing Systems. The primary program effort was directed toward the evaluation of reliability, availability, safety, and human factors for airborne systems ranging fr tm Simplex to multi-channel Fail Operative configurations. Included in the report are mathematical models depicting reliability and safety as a function of system configuration and operating parameters. From the Reliability models, a computerized program is generated, presenting the reliability, availability, and safety of the various systems being considered for Category III landings. Also, as part of this program, a Human Factors error analysis was conducted to determine the probability of human error, based on the tasks required to perform a Category III landing. Using the results of the Human Error analysis and the Airborne System Reliability analysis, a safety model was derived that presents the probability of occurrence of a hazardous event. As a result of these studies, data was generated to allow comparison of systems with respect to reliability and safety, and to outline potential problem areas. A Volume II of this report has been published under a separate cover. Volume II contains supplementary data, presented in the form of appendices, developed in support of the analysis presented herein.
AD-655 240 HC$3.00 MF$0.65

DEVELOPMENT OF ALL WEATHER LANDING SYSTEM RELIABILITY ANALYSIS AND CRITERIA FOR CATEGORY III AIRBOREE SYSTEMS, PHASE III. VOLUME II. APPENDICES,
Lockheed-Georgia Co Marietta
L. A. Adkins, J. D. St. Clair, M. C. Thatro, and H. R. Willis. May 67, 103p Rept no. ER 8957-Vol-2
FAA-RD-67-20-Vol-2
Contract FA-65-WA-1376
See also AD-655 240, Volume 1.

Descriptors: (*Aircraft landings, *All-weather aviation), (*Aviation accidents, *Aviation safety), Reliability, Numerical analysis, Instrument landings, Human engineering, Flight control systems, Monitors.

The primary program effort was directed toward a quantitative evaluation of reliability, availability, safety and human factors for airborne systems. Since a number of considerations associated with Category III landing problems presently defy quantification, an appendix has been developed to investigate in general these considerations. The reliability analysis presented in Volume I has required a large and varied number of calculations. Appendices have been developed to present examples of the manner in which these calculations were effected. Also presented is a discussion of a proposed two channel system exhibiting a fail operative capability, which is contrary to the fail passive characteristics of a two channel system assumed in Volume I. During this program, a considerable amount of research was conducted to provide a basis for the development of a quantitative human error prediction procedure. The results of this research is presented in appendices covering general human factors considerations associated with Category III systems and an analysis of accident data which was conducted to investigate human error characteristics of aircraft accidents.
AD-655 241 HC$3.00 MF$0.65

SONIC BOOM EXPERIMENTS AT EDWARDS AIR FORCE BASE.
Interim rept.
Stanford Research Inst Menlo Park Calif
28 Jul 67, 410p
NSBEO-1-67
Contract AF 49 (638)-1758

Descriptors: (*Sonic boom, Response), (*Reaction (Psychology), Sonic boom), (*Structures, Sonic boom), Animals, Humans, Supersonic planes, Airplane noise, Propagation, Damage, Acceptability, Tests, Seismology.
Identifiers: Supersonic transport aircraft.

A series of tests was conducted in which human subjects (located indoors and outdoors), special test structures, and animals were exposed to booms from F-104, F-106, B-58, SR-71, and XB-70 supersonic aircraft, and the noise from KC-135 and WC-135B subsonic aircraft. Physical measurements were made of the sonic boom signatures, subsonic aircraft noise, and the response of structures to the booms and noise. Psychological measurements were made of the subjective acceptability to several hundred subjects of the booms and subsonic aircraft noise. Details of the test plan and procedures, and the results of the data analyzed to date are presented. (Author)
AD-655 310 HC$3.00 MF$0.65

NEWS OF INSTITUTIONS OF HIGHER LEARNING. AERONAUTICAL ENGINEERING: No. 1 1964, COLLECTION OF ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
27 Apr 67, 322p Rept no. FTD-MT-64-288
TT-67-62350
Edited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR), n1 190p 1964.

Descriptors: (*Aeronautics, Abstracts), (*Aerodynamics, *Aircraft), Aerodynamic heating, Airfoils, Fuels, Motion, Gas turbines, Gas flow, Magnetohydrodynamics, Elasticity, Numerical analysis, USSR.

The report includes abstracts of articles concerning aerodynamic characteristics of aircraft, gas turbines, flight vehicles, flight mechanics, and thermodynamics.
AD-655 358 HC$3.00 MF$0.65

ANALYSIS OF CONTROL AND TRAFFIC IN OPERATIONAL NAS ENVIRONMENT.
Franklin Inst Research Labs Philadelphia Pa
For primary bibliographic entry see Field 17G.
AD-655 467 HC$3.00 MF$0.65

A COMPARISON OF COCKPIT WARNING SYSTEMS.
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1C.
AD-655 772 HC$3.00 MF$0.65

SESSION OF THE WGLR TECHNICAL COMMITTEE FLUGMECHANIK.
Bericht Ueber Die Sitzung des Wglr- Fachausschusses Flugmechanik
Wissenschaftliche Gesellschaft Fuer Luft- Und Raumfahrt, Brunswick (West Germany).
Dec 66, 92p DLR-MITT.-66-23
in German Symp. Held At Ottobrunn, W. Germany, 18 May 1966

Descriptors: *Aircraft design, *Aircraft instrumentation, *Conference, *Cost estimate, *Data recording, *Flight mechanics, *Guidance and control, *Handling quality, *Performance prediction,

*Pilot, Aerospace, Aircraft, Analysis, Automatic, Ballistics, Control, Cost, Criterion, Data, Design, Estimate, Flap, Flight, Ground, Guidance, Handling, Instrumentation, Magnetic, Mechanics, Parameter, Performance, Prediction, Quality, Recording, Simulation, Stability, Stabilizer, Supersonic, Tape, Telemetry, Wing.

For abstract, see STAR 05 17.
N67-30450 HC$3.00 MF$0.65

A PILOTED SIMULATION STUDY OF OPERATIONAL ASPECTS OF THE STALL PITCH-UP.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
G. E. Cooper, and M. D. White. Jul 67, 30p
NASA-TN-D-4071

Descriptors: *Flight simulation, *Stalling, *Transport aircraft, Aircraft, Angle of attack, Bump, Control, Flight, Instability, Localization, Moment, Motion, Penetration, Pilot, Pitch, Recovery, Simulation, Transport, Variation.

For abstract, see STAR 05 17.
N67-31449 HC$3.00 MF$0.65

1C. Aircraft

POWERED MODEL INVESTIGATION OF THE EFFECTS OF GATED SPOILERS ON THE AERODYNAMIC CHARACTERISTICS OF WINGS AT ANGLES OF ATTACK FROM 0 TO 90 DEGREES,
Naval Ship Research and Development Center Washington D C Aerodynamics Lab
For primary bibliographic entry see Field 20D.
AD-655 248 HC$3.00 MF$0.65

INVESTIGATION OF THE EFFECTS OF RADIANT HEAT ON THE STRUCTURAL EFFICIENCY OF AIRCRAFT AND MISSILE COMPONENTS MADE OF GLASS-FIBER-REINFORCED PLASTIC LAMINATES.
Naval Air Engineering Center Philadelphia Pa Aeronautical Structures Lab
For primary bibliographic entry see Field 11I.
AD-655 442 HC$3.00 MF$0.65

HIGH-SPEED ABRASION OF TEXTILE CORDAGE ON AN ASPHALT SURFACE.
Royal Aircraft Establishment Farnborough (England)
For primary bibliographic entry see Field 11E.
AD-655 484 HC$3.00 MF$0.65

ATOMIC ENERGY IN AVIATION AND ROCKET TECHNOLOGY: COLLECTION OF ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 15F.
AD-655 596 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART I. EXECUTIVE SUMMARY,
Department of Commerce Washington D C
John T. Connor. 9 Mar 65, 170p
See also AD-655 604 and AD-655 605.

Descriptors: (*Supersonic planes, Economics), (*Transport planes, Economics), Feasibility studies, Decision making, Design, Costs, Air transportation, Sonic boom, Specifications, Aircraft industry, Cost effectiveness, Analysis.
Identifiers: Supersonic transport aircraft.

Contents: Authority for study; Statement of the problem; Policy issues: pace, competition, and risk-sharing; Aircraft considered; Summary of results and policy considerations; Study approach; Aircraft descriptions; Estimating markets for air transport and aircraft; Ranking of program alternatives; Economic significance of sonic boom; SST program financing; Balance of payments effects.
AD-655 603 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART I. EXECUTIVE SUMMARY, PRELIMINARY SUPPLEMENT I,
Department of Commerce Washington D C
John T. Connor. 30 Apr 65, 90p
See also AD-655 603.

Descriptors: (*Supersonic planes, Economics), (*Transport planes, Economics), Feasibility studies, Sonic boom, Cost effectiveness, Management planning, Analysis, Costs, Aircraft industry.
Identifiers: Supersonic transport aircraft.

Contents: Purpose and scope; Program alternatives; Prospectus (continuation of the SST program, termination of the SST program); Cost-benefit analysis (program ranking, policy issues, sensitivity analysis, comparative cash flows).
AD-655 604 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART I. EXECUTIVE SUMMARY, PRELIMINARY SUPPLEMENT II,
Department of Commerce Washington D C
John T. Connor. 11 May 65, 40p
See also AD-655 603.

Descriptors: (*Supersonic planes, Economics), (*Transport planes, Economics), Feasibility studies, Aircraft industry, Cost effectiveness, Analysis, Management control systems, Management planning, Design.
Identifiers: Supersonic transport aircraft.

The question of program financing and control is discussed in three parts: (1) Alternative approaches, (2) Analysis of program risks, and (3) Design competition and product improvement.
AD-655 605 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. A. AIR TRAVEL DEMAND ANALYSIS,
Systems Analysis and Research Corp Boston Mass
Sam I. Aldock. 7 Jan 65, 156p
Contract C-8-65
See also Part I, AD-655 603. Part II was never issued.

Descriptors: (*Supersonic planes, Economics), (*Transport planes, Economics), Air transportation, Analysis, Management planning, Scheduling, Cost effectiveness, Costs.
Identifiers: Supersonic transport aircraft.

Contents: The demand model (analytical and empirical development, projected economic growth in free world, free world origin and destination data, 'state of the art' factor in assessing air travel growth, 'business' and 'personal' air travel, elasticity of demand with regard to fare, seasonal and directional variations in air traffic, effects of service distinctions on travel demand); Relative attractiveness of aircraft types (value of time, evaluation of the piston-subsonic jet transition period, development of the income equivalence approach, income equivalence forecast).
AD-655 606 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. B. COST PERFORMANCE.
Department of Commerce Washington D C
15 Dec 64, 445p
Prepared in cooperation with Operations Research, Inc., TR-295, Contract SD-275; and Planning Research Corp., Los Angeles, Calif., PRC-R-634, Contract SD-274. See also AD-655 606.

Descriptors: (*Supersonic planes, Economics), (*Transport planes, Economics), Cost effectiveness, Analysis, Predictions, Design, Performance (Engineering), Multivariate analysis, Costs, Feasibility studies.
Identifiers: Supersonic transport aircraft.

The study was directed to the development of cost estimating relations (CERs) to predict the costs of the Supersonic Transport (SST) and competing current and advanced subsonic transports. The CERs developed relate cost to physical, performance, and operational characteristics of the aircraft system and cover research and development (R and D) costs, investment costs, and both direct and indirect operating costs. The basic method used to develop the CERs consisted of multivariate regression analysis of historical data on similar systems. The equations so developed were modified to extend their applicability to SST physical characteristics and operating points. The report also summarizes the results of a study to develop aircraft system performance-cost relationships. Cost estimating relationships (CER's) were constructed to cover development (R and D) costs, production (investment) costs and airline operating costs (direct and indirect). Primary emphasis in application will be on supersonic aircraft designs proposed by airframe and engine manufacturers on 1 November 1964. (Author)
AD-655 607 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. C. SONIC BOOM.
Special rept.,
Institute for Defense Analyses Arlington Va Economic and Political Studies Div
Norman J. Asher, Stanley W. Dziuban, and William Hamburger. Dec 64, 150p
Contract C-30-65
See also AD-655 607.

Descriptors: (*Supersonic planes, Economics), (*Transport planes, Economics), Sonic boom, Damage, Costs, Analysis, Buildings, Mathematical models, Cost effectiveness.
Identifiers: Supersonic transport aircraft.

The purpose of the study is to estimate claims costs resulting from the sonic boom of the SST, and to examine tradeoffs between these costs and aircraft operating costs for various operating procedures designed to reduce claims costs. Claims for damage to ground structures comprise by far the largest category of claims. Based on the Oklahoma City data, the major item of cost was administrative handling of the claims. Actual payments for alleged damages were small. The Oklahoma City claims data are representative of the situation that may exist in the US and Canada during the SST operations. However, they are almost certainly not representative of the situation that will be found in other areas of the world. SST operations should not damage the basic structure of reasonably well-constructed buildings. It is not clear that an airline (or the Federal government, for that matter) would be liable for sonic boom damage resulting from the operation of a commercial transport, flown in accordance with flight rules and procedures prescribed by the federal government.
AD-655 608 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. D. ROUTE SIMULATION.
Department of Commerce Washington D C
Dec 64, 380p
Prepared in cooperation with Operations Research, Inc., Silver Spring, Md., TR-294, Contract C-9-65; National Bureau of Standards, Washington, D. C.; Goddard Space Flight Center, Greenbelt, Md.; and International Business Machines, Washington, D. C., Federal Systems Div. See also AD-655 608.

Descriptors: (*Supersonic planes, Economics), (*Transport planes, Economics), Flight paths, Simulation, Air traffic, Air transportation, Scheduling, Costs, Management planning, Analysis, Computer programs, Mathematical models.
Identifiers: Supersonic transport aircraft.

The report consists of two studies. In one study, a world airline route simulation model was developed to provide a means for estimating the probable impact of the availability of new types of subsonic and supersonic transport planes to the free-world air carriers. The other study is a detailed technical documentation for the 'in-house' world route simulation effort.
AD-655 609 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. E. FINANCIAL CAPABILITY.
Department of Commerce Washington D C
6 Jan 65, 156p
Prepared in cooperation with Booz-Allen and Hamilton, Inc., New York, and Altschul (Selig) Aviation Advisory Service, New York, Contract C-110-65. See also AD-655 609.

Descriptors: (*Supersonic planes, Economics), (*Transport planes, Economics), Air transportation, Aircraft industry, Costs, Analysis, Foreign aid, Commercial planes, Cost effectiveness.
Identifiers: Supersonic transport aircraft.

Two studies were conducted to provide historical financial perspective on the domestic and foreign airlines, the U. S. airframe and engine manufacturers, and the U. S. financial community providing funds to the airlines and manufacturers.
AD-655 610 HC$3.00 MF$0.65

INDUSTRIAL-LOCATION THEORY IN THE ERA OF SUPER-CARGO AIRCRAFT,
Analytic Services Inc Falls Church Va
For primary bibliographic entry see Field 5C.
AD-655 695 HC$3.00 MF$0.65

A COMPARISON OF COCKPIT WARNING SYSTEMS.
Final rept.,
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
Almon J. Bate, and Charles Bates, Jr. Apr 67, 30p Rept no. AMRL-TR-66-180

Descriptors: (*Cockpits, Warning systems), (*Warning systems, Malfunctions), Effectiveness, Visual signals, Auditory signals, Indicator lights, Performance tests, Voice communication systems, Recording systems.

The experiment was designed to compare three types of aircraft cockpit warning systems: (1) Visual: malfunctions simultaneously activated a master warning light and a specific malfunction indicator light. (2) Visual and tone: malfunctions simultaneously activated an intermittent sweeping tone (through earphones), a master warning light, and a specific malfunction indicator light. (3) Visual and voice: malfunctions simultaneously activated a master warning light, a specific malfunction indicator light, and a voice recording which informed the operator through his earphones of the specific malfunction needing attention. Three groups of 11 university students served as subjects. While responding to a visual, visual-tone, or visual-voice warning system, each subject was also required to find and position, under cross hairs, a series of strategic targets on a strip of rear-projected aerial photographic imagery. No statistically significant differences among the three warning systems were found in the speed of reaction to the master warning light, reaction to the specific-indicator panel, total reaction time, or number of strategic targets found or missed. The results of the study suggest that the addition of either a tone or a voice warning to a visual, master plus specific, malfunction warning system is of questionable value in a 'heads-in' cockpit situation where the visual system can be seen. The data from the experiment do not suggest that a voice warning system has any advantagn over a simple aural signal for augmenting a visual system. (Author)
AD-655 772 HC$3.00 MF$0.65

HANDS-FREE, PRECISION CONTROL FOR SMALL HOVERING VEHICLES - A FLYING QUALITIES STUDY FINAL REPORT.
Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.
H. Bruel, G. Gardner, J. Ohagan, and R. Weston.
Jan 67, 52p NASA-CR-73104, RE-276
Contract NAS2-2595

Descriptors: *Control system, *Flight simulator, *Hovering rocket, *Human performance, Analysis, Balance, Computer, Control, Data, Digital, Flight, Hovering, Human, Inertia, Moment, Onboard, Performance, Pilot, Platform, Reflex, Rocket, Simulator, System.

For abstract, see STAR 05 17.
N67-31406 HC$3.00 MF$0.65

AIRCRAFT AND INSTRUMENTATION IN ATMOSPHERIC RESEARCH.
National Center for Atmospheric Research, Boulder, Colo.
For primary bibliographic entry see Field 4B.
PB-175 566 HC$3.00 MF$0.65

1D. Aircraft Flight Control and Instrumentation

THE INCREASE OF THE RELIABILITY AND ACCURACY OF POTENTIOMETRIC PICKUPS OF GYROSCOPIC INSTRUMENTS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 17G.
AD-655 363 HC$3.00 MF$0.65

ON THE STABILITY OF A RATE-GYRO UNDER THE INFLUENCE OF FORCED ROTATIONAL MOTIONS OF ITS BASE.
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Oberpfaffenhofen (West Germany). Institut Fuer Steuer- Und Regeltechnik.
For primary bibliographic entry see Field 12A.
For abstract, see STAR 05 17.
N67-30762 HC$3.00 MF$0.65

2. AGRICULTURE

2B. Agricultural Economics

SOVIET AGRICULTURAL MARKETINGS AND PRICES, 1928-1954.
RAND Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 5C.
AD-133 013 HC$3.00

GOVERNMENT ACQUISITION OF AGRICULTURAL OUTPUT IN MAINLAND CHINA, 1953-56.
RAND Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 5C.
AD-211 940 HC$3.00

THE AGRICULTURAL LABOR FORCE AND POPULATION OF THE USSR: 1926-41.
RAND Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 5C.
AD-85 428 HC$3.00

SURVEY OF SOLAR CYCLE PREDICTION MODELS.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
J. A. Scissum. 30 Mar 67, 39p NASA-TM-X-53593

Descriptors: *Prediction theory, *Solar cycle, Activity, Analysis, Characteristics, Cycle, Cyclic, Data, Formation, Index, Model, Prediction, Reliability, Solar, Statistics, Sunspot, Theory.

For abstract, see STAR 05 17.
N67-31334 HC$3.00 MF$0.65

2C. Agricultural Engineering

EQUIPMENT AND TECHNIQUES FOR APPLYING HERBICIDES TO VEGETATION IN PUERTO RICO AND TEXAS. PART II. AGRICULTURAL ENGINEERING STUDIES - TEXAS.
Agricultural Research Service Washington D C
For primary bibliographic entry see Field 6F.
AD-655 629 HC$3.00 MF$0.65

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

ON THE COSMOLOGICAL DISTORTION EFFECT.
Washburn Observatory Madison Wis
For primary bibliographic entry see Field 3B.
AD-655 718 Not available from CFSTI.

INFRARED ASTRONOMY.
Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
N. J. Woolf. Aug 66, 16p NASA-CR-85849, TG-30
Contract NSR-24-005-047

Descriptors: *Astronomical observatory, *Earth atmosphere, *Infrared astronomy, Astronomy, Atmosphere, Carbon dioxide, Earth, Infrared, Manned, Observatory, Rotation, Transmission, Unmanned, Vibration, Water vapor.

For abstract, see STAR 05 17.
N67-31496 HC$3.00 MF$0.65

3B. Astrophysics

DETERMINATION OF MARTIAN AND CYTHEREAN ATMOSPHERIC COMPOSITION WITH AN ENTRY PROBE BY MEASUREMENT OF ULTRAVIOLET AND X-RAY ATTENUATION,
Douglas Aircraft Co Inc Huntington Beach Calif Missile and Space Systems Div
F. F. Fish, and V. A. Sirounian. Apr 67, 22p Rept no. DAC-60627

Descriptors: (*Planetary atmospheres, *Mars (Planet)), (*Absorption spectrum, Planetary atmospheres), (*Venus (Planet), Planetary atmospheres), Density, Atmosphere models, Solar radiation, Carbon dioxide, X rays, Ultraviolet radiation, Nitrogen, Density, Venus probes, Mars probes.

Measurement of the attenuation of solar ultraviolet radiation in three wavelength bands and of solar X-rays in one band can provide considerable information about the structure and composition of the

Martian atmosphere. The four bands are chosen so as to permit the maximum of information about the atmosphere consistent with the simplicity of the experiment. Two bands, 2200-3000 A and 3000-4000 A, furnish information on molecular density, aerosol content, and ozone, if present, in the atmosphere below 15-25 km. These bands may also detect high altitude aerosol layers. The other two bands, 2-8 A and 1050-1350 A (or 1225-1350 A, or 1425-1480 A), furnish information on CO2 number density and total number density in the upper atmosphere. Similar experiments in the upper Cytherean atmosphere using the sun as a source and in the lower Cytherean atmosphere using artificial sources are discussed. (Author)
AD-655 201 HC$3.00 MF$0.65

EXPERIMENTAL TEST OF THE FREUNDLICH RED-SHIFT HYPOTHESIS,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Gerald D. Blum, and Rainer Weiss. 30 Sep 66, 2p
Contract DA-36-039-AMC-03200 (E)
Availability: Published in The Physical Review v155 n5 p1412-3 Mar 25 1967.

Descriptors: (*Doppler effect, Astrophysics), Photons, Lasers, Interferometers, Measurement, Optical properties.
Identifiers: Redshift, Freundlich hypothesis.

An experiment to test the Freundlich photon-scattering hypothesis, which was designed to explain the Hubble cosmological red shift, is described. Laser light is passed through an rf cavity placed in one arm of an interferometer sensitive to 10 to the -8th power fringe shift. The experiment sets a limit of delta nu/nu < 10 to the -18th power on the frequency shift of 6328-A photons passing through 2 m of X-band radiation field with an energy density of 2 erg/cc. (Author)
AD-655 209 Not available from CFSTI.

THE PRECESSION AND NUTATION OF DEFORMABLE BODIES III. OSCILLATIONS OF INCOMPRESSIBLE VISCOUS GLOBES,
Boeing Scientific Research Labs Seattle Wash
For primary bibliographic entry see Field 20D.
AD-655 223 HC$3.00 MF$0.65

SPECTRAL STUDIES OF MATERIALS POSSIBLY PRESENT ON THE MARTIAN SURFACE.
Final rept. no. 2, 1 Feb 66-31 Jan 67,
Texas Technological Coll Lubbock Dept of Chemistry
Arthur L. Draper, and Joe A. Adamcik. 1 Jun 67, 13p
Contract Nonr (G)-00010-66
See also AD-630 806.

Descriptors: (*Mars (Planet), *Soils), Surface properties, Spectroscopy, Iron oxides, Quartz, Clay minerals, Magnetite, Temperature, Particle size.
Identifiers: Hornblende.

Comparing the reflectance spectra of synthetic mixtures with the observed spectrum of Mars has been continued to develop mixtures congruous with the Martian soil so that limits may be set on its composition. Mixtures containing various amounts of the iron oxides goethite and hematite precipitated on finely ground quartz and kaolin show the features of the Martian spectrum after the addition of dark materials such as magnetite or hornblende. The effect of temperature, particle size and iron oxide content on the spectra of the mixture components was examined. At low temperatures (-190C) spectral features are detectable. A synthetic material of particle size less than 37 microns is required to give a proper match to the Martian spectrum. The spectra of mixtures containing in the vicinity of 10% iron oxides do not seem to be highly sensitive to the total iron oxide content. (Author)
AD-655 257 HC$3.00 MF$0.65

ELECTRON TEMPERATURES OF IONIZED NEBULAE DERIVED FROM H BETA AND RADIO FLUX DENSITIES,
Ohio State Univ Research Foundation Columbus
H. C. Ko. 9 Dec 66, 7p Rept no. Scientific-3
AFCRL-67-0385
Contract AF 19 (628)-6145
Availability: Published in The Astrophysical Journal v148 p927-9 Jun 1967.

Descriptors: (*Nebulae, Temperature), (*Electrons, Temperature), Hydrogen, Selection rules, Absorption spectrum, Astrophysics.

Electron temperatures of nine planetary nebulae and one H II region were derived using the observed HB and radio flux densities. The average electron temperature is 8600 degrees Kelvin. The temperatures obtained are consistently lower than those obtained from the ratio of (0 III) lines. (Author)
AD-655 273 Not available from CFSTI.

PLANETARY RADAR ASTRONOMY.
Meeting speech,
Massachusetts Inst of Tech Lexington Lincoln Lab
Irwin I. Shapiro. 1966, 24p Rept no. MS-1658
ESD-TR-67-268
Contract AF 19 (628)-5167
Availability: Published in Moon and Planets p103-25 1966.

Descriptors: (*Radio astronomy, *Planets), Rotation, Venus (Planet), Mercury (Planet), Radio waves, Planetary atmospheres, Doppler effect, Periodic variations, Astronomical data.

Radar determinations of the Astronomical Unit and the orbits, radii, and rotation vectors of the inner planets are reviewed. Current developments in the theory of the axial rotations of Venus and Mercury are described, as is a proposed radar test of general relativity. Radar evidence of absorption of high frequency radio waves in the atmosphere of Venus is also discussed. (Author)
AD-655 315 Not available from CFSTI.

RADIATION BELTS OF THE EARTH USING SOVIET EARTH SATELLITE AND COSMIC ROCKETS 1957-1959,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 4A.
AD-655 364 HC$3.00 MF$0.65

RESEARCH ON RELATIONS BETWEEN COMETARY, SOLAR AND UPPER ATMOSPHERIC PROCESSES.
Final scientific rept. 1 Apr 62-31 Mar 67,
Liege Univ (Belgium) Dept of Astrophysics
Pol Swings. 10 Apr 67, 127p
AFCRL-67-0303
Contract AF 61 (052)-587

Descriptors: (*Optical instruments, Astrophysics), (*Spectra (Visible + ultraviolet), Astronomy), Meteors, Selection rules, Molecular spectroscopy, Photomultipliers, Diffraction gratings, Aurorae, Polar regions, Galaxies, Comets, Stars, Anomalies, Absorption spectrum, Sun, Planets.

Laboratory work has been carried on: the time resolution of spectra; the spectra of several molecules of astronomical or geophysical interest; various photometric and spectrographic instruments; the study of photomultipliers; the study of diffraction gratings. The physical mechanisms in comets have been further discussed. Other instrumental, observational and theoretical programs of cometary, solar and stellar investigations have been started. Investigations related to space experiments are mainly concerned with the far ultraviolet spectra of stars, planets, comets and aurorae, and with artificial comets. New types of spectrographs have been designed and constructed in preparation of space experiments. (Author)
AD-655 385 HC$3.00 MF$0.65

A NEW SPECTROPHOTOMETER FOR MEASURING ULTRAVIOLET SKY BRIGHTNESS AND DIRECT SOLAR RADIATION.
Physikalisch-Meteorologisches Observatorium Davos Davos-Platz (Switzerland)
For primary bibliographic entry see Field 20F.
AD-655 394 HC$3.00 MF$0.65

MAGNETIC FIELDS AND SMALL-SCALE STRUCTURE OF THE SOLAR ATMOSPHERE,
Harvard Coll Observatory Cambridge Mass Solar Dept
D. H. Menzel, and B. W. Shore. Apr 67, 16p Rept no. Scientific-15
AFCRL-67-0216
Contract AF 19 (628)-3322
Availability: Published in Pubblicazioni del Comitato Nazionale per le Manifestazioni Celebrative del IV Centenario della Nascita di Galileo Galilei v2 n4 p308-18 1966.

Descriptors: (*Solar atmosphere, Mathematical models), (*Magnetic fields, Solar disturbances), Sunspots, Chromosphere, Magnetohydrodynamics, Temperature.

The paper examines the perturbing effect of a rectangular gridwork of tufted magnetostatic fields on a static plane-parallel stratified plasma, as a possible idealized model of small-scale structure of the solar photosphere. (Author)
AD-655 400 Not available from CFSTI.

GENERAL CONCLUSIONS,
Harvard Coll Observatory Cambridge Mass Solar Dept
D. H. Menzel. Apr 67, 11p Rept no. Scientific-16
AFCRL-67-0217
Contract AF 19 (628)-3322
Availability: Published in Pubblicazioni del Comitato Nazionale per le Manifestazioni Celebrative del IV Centenario della Nascita di Galileo Galilei v2 n4 p336-41 1966.

Descriptors: (*Solar atmosphere, *Magnetic fields), (*Solar disturbances, Symposia), Solar radiation, Magnetohydrodynamics, Sunspots, Solar corona, Spectroscopy, Astrophysics.

The Conference on Solar Magnetic fields was very successful. In addition to the basic information presented, the participants gained knowledge of one another's fields by the informal exchange of ideas. The topics ranged from instruments and instrumental techniques, through miscellaneous observational results to theoretical interpretation. The breadth of the conference contributed to its general success. (Author)
AD-655 402 Not available from CFSTI.

DIMENSION OF THE COSMIC RAY MODULATION REGION,
Chicago Univ Ill Enrico Fermi Inst for Nuclear Studies
J. A. Simpson, and J. R. Wang. Jun 67, 16p Rept no. EFINS-67-57
AFOSR-67-1611
Contract AF 49 (638)-1642
Submitted for publication in Astrophysical Journal 14p n.d.

Descriptors: (*Solar disturbances, Cosmic rays), (*Cosmic rays, Modulation), (*Mathematical models, Cosmic rays), Solar corona, Sunspots, Solar wind, Magnetic fields, Space probes, Solar radia-

els, Cosmic rays), Solar corona, Sunspots, Solar wind, Magnetic fields, Space probes, Solar radiation.

There is an order of magnitude difference between the effective depth L of the eleven-year solar modulation region derived from recent space probe measurements (L<5 a.u.) and derived from the dynamical phase lag of changes in cosmic ray intensity and solar activity (L > 40 a.u.) near the solar minimum of 1965. By assuming that changes in solar coronal emission (at 5303 A), instead of changes in sunspot number or radio emission, are correlated with solar wind characteristics responsible for modulation, there is a reduced dynamical phase lag which leads to L = or < 10 a.u. (Author)
AD-655 479 Not available from CFSTI.

INSTABILITIES IN HIGHLY EVOLVED STELLAR MODELS.
Revised ed.,
California Inst of Tech Pasadena
G. Rakavy, and G. Shaviv. 18 Nov 66, 15p
Contract Nonr-220 (47), Grant NSF-GP-5391
Revision of manuscript submitted 1 Jun 66.
Availability: Published in The Astrophysical Journal v148 p803-16 Jun 1967.

Descriptors: (*Stars, Nuclear models), (*Oxygen, Stars), (*Neutrinos, Stars), (*Supernovae, Models (Simulations)), Relativity theory, Astrophysics, Stability, Pair production, Nuclear reactions, Equations of state, Temperature, Photons.
Identifiers: Evolution (Cosmology).

The structure of heavy stars at highly evolved stages of evolution is considered. It was found that radiation relativistic effects on the electrons and pair creation induce a dynamical instability in stars heavier than about 30 solar masses. The evolution of a 30 solar masses oxygen star is described in some detail up to the point where it becomes dynamically unstable. (Author)
AD-655 493 Not available from CFSTI.

ON SOME COINCIDENCES BETWEEN WAVELENGTHS OF ABSORPTION FEATURES IN HZ 29 AND IN QUASI-STELLAR OBJECTS,
California Univ San Diego La Jolla
G. Burbidge, M. Burbidge, and F. Hoyle. 10 Jan 67, 3p
Contract Nonr-220 (47), Grant NSF-GP-5391
Research supported in part by NASA Grant NsG-357.
Availability: Published in Astrophysical Journal v147 n3 p1219-21 Mar 1967.

Descriptors: (*Absorption spectrum, Astronomical data), (*Extraterrestrial radio waves, Sources), Helium, Stars, Galaxies, Spectra (Visible + ultraviolet), Astrophysics.
Identifiers: Quasars, HZ 29, White dwarf stars, Redshift.

Further comments are noted concerning the many remarkable coincidences in the measured positions of the absorption lines in the spectra of several quasi-stellar objects.
AD-655 494 Not available from CFSTI.

ON THE INVERSION OF THE DENSITY GRADIENT AT THE FRINGE OF THE CONVECTION ZONE,
California Inst of Tech Pasadena
S. M. Chitre, and G. Shaviv. 18 Jan 67, 8p
Contract Nonr-220 (47), Grant NSF-GP-5391
Availability: Published in Proceedings of the National Academy of Sciences v57 n3 p573-9 Mar 1967.

Descriptors: (*Density, Stars), (*Convection (Heat transfer), *Solar atmosphere), Temperature, Thermal radiation, Heat transfer, Thermodynamics, Mathematical models.

It is well known that the total pressure and the temperature increase as one goes inward from the surface to the center of a star. That the density, on the other hand, does not necessarily increase with depth below the surface was pointed out by Hoyle and Schwarzschild (1955) and was borne out quite clearly by the numerical integrations of the solar surface layers by Faulkner, Griffiths, and Hoyle (1963). The question was raised by Tayler and Gough (1963) as to whether the density gradient inversion was real or whether it was due to the particular model of convection adopted by Faulkner et al. It is the purpose of this note to show that the inversion is indeed genuine and results from the steep temperature gradient that exists in the outermost layers of the convection zone where convection is not fully efficient and carries only a fraction (<1/2) of the total energy flux. Also, the electron pressure-temperature plane can be divided into regions where d rho/dT is negative and positive. The dividing line depends, in an insensitive manner, on the assumed model and efficiency of convection. In the case of the sun it is the hydrogen ionization at about 10,000 degrees K that causes the opacity to go up sharply and as a result the temperature gradient steepens there by inverting the density gradient. The inversion necessarily results in a Rayleigh-Taylor instability. (Author)
AD-655 495 Not available from CFSTI.

ON THE NECESSITY OF SCHWARZSCHILD'S CRITERION FOR STABILITY,
California Inst of Tech Pasadena
N. R. Lebovitz. 8 Jun 66, 4p
Contract Nonr-220 (47), Grant NSF-GP-5391
Availability: Published in Astrophysical Journal v146 n3 p946-9 Dec 1966.

Descriptors: (*Gases, Stability), Theorems, Operators (Mathematics), Mathematical analysis.

This Note extends the work, begun in two previous papers (Lebovitz 1965a,b), devoted to deducing Schwarzschild's criterion for the stability of spherical gaseous masses by means of the linear stability theory. The principal purpose of this Note is to show that the usual stability criterion, viz., S (r) = p' (r)- (gamma p/rho) rho' (r) = or > o for o = or < r = or 1 R, is necessary for stability. Here gamma, p, rho, and R are the ratio of specific heats and the pressure, density, and radius of the equilibrium configuration, respectively.
AD-655 497 Not available from CFSTI.

PREDICTED EMISSION SPECTRA OF QUASI-STELLAR SOURCES IN THE FAR ULTRAVIOLET.
Revised ed.,
California Inst of Tech Pasadena
John N. Bahcall, and Wallace L. W. Sargent. 17 Mar 67, 5p
Contract Nonr-220 (47), Grant NSF-GP-5391
Revision of manuscript submitted 8 Feb 67. Prepared in cooperation with Mount Wilson and Palomar Observatories and Carnegie Institution of Washington, D. C.
Availability: Published in Astrophysical Journal v148 pL65-8 May 1967.

Descriptors: (*Nebulae, Spectra (Visible + ultraviolet)), Isotope availability, Astrophysics, Atomic energy levels, Blackbody radiation.
Identifiers: Quasars, Redshift.

This letter predicts the main emission features of quasi-stellar sources at wavelengths shorter than Ly-alpha (wavelength = 1215 A). The aim is twofold. First, we wish to single out the main emission lines which might be found in objects having emission redshifts Z greater than 2 and which might therefore aid in the discovery of such large redshift objects. Second, we point out some observational consequences that obtain for quasi-stellar sources that are optically thick beyond the Lyman limit. In particular we show that, if the average strength of the Ly-alpha line is as strong as in 3C 9 (Oke 1966) and/or there is little radiation beyond the Lyman limit, then a quasi-stellar source with Z approximately, or > 2.3 will have much redder U - B colors than those with Z approximately, or < 2.3. The fact that quasi-stellar sources with large redshifts may appear as red stellar objects could interfere with their discovery by present techniques, which often presume an ultraviolet excess. We also show that observations of the characteristic time variations for radiation blueward of wavelength = 912 A would be an important test of the hypothesis that the redshifts of quasi-stellar sources are caused by the general expansion of the Universe. The search is limited for important emission lines to the spectral regions 912-1215 A since the behavior of the spectrum shortward of the Lyman limit is strongly model-dependent. Within the stated range we search for lines in the spectra of all ionization stages of the most abundant elements--H, He, C, N, O, Ne, Mg, Si, S, Ar, and Fe. Our procedure is empirical.
AD-655 498 Not available from CFSTI.

PRIMORDIAL ELEMENT FORMATION, PRIMORDIAL MAGNETIC FIELDS, AND THE ISOTROPY OF THE UNIVERSE,
California Inst of Tech Pasadena
Kip S. Thorne. 2 Sep 66, 19p
Contract Nonr-220 (47), Grant NSF-GP-5391
Prepared in cooperation with Princeton Univ., N. J. Palmer Physical Lab. Research supported in part by AF contract AF 49 (638)-1545.
Availability: Published in The Astrophysical Journal v148 p51-68 Apr 1967.

Descriptors: (*Mathematical models, Astrophysics), (*Galaxies, Sources), Dynamics, Isotope availability, Microwaves, Relativity theory, Isotropism, Anisotropy, Magnetic fields.
Identifiers: Evolution (Cosmology), Big-bang theory, Universe.

A detailed discussion is presented of homogeneous cosmological models which (i) have two equivalent 'tangential' directions and one inequivalent 'longitudinal' direction at each point in spacetime; (ii) have zero rotation; (iii) contain a perfect fluid obeying an equation of state p = p (rho); and (iv) contain a magnetic field frozen into the matter and pointing in the longitudinal direction. By means of these cosmological models it is shown that, if the big-bang general-relativistic theory of the universe is correct, and if the galactic magnetic fields which are observed today were primordial in origin, then the universe was probably very anisotropic in its early stages. These cosmological models are also used to evaluate the implications of astronomical observations for the isotropy of the universe. It is shown that the current 3 per cent limit on the anisotropy of the cosmic microwave radiation places limits on the large-scale isotropy of the universe, which are many orders of magnitude stronger than limits inferred from the observed isotropy of extragalactic redshifts. Finally, an analysis is presented of primordial element formation in anisotropic cosmological models. (Author)
AD-655 524 Not available from CFSTI.

MODEL STELLAR ATMOSPHERES.
Final rept. 1 Dec 65-31 May 67,
Texas Univ Austin Dept of Astronomy
Frank N. Edmonds, Jr. 3 Aug 67, 8p
Grant Nonr (G)-00007-66

Descriptors: (*Stars, Atmosphere models), (*Infrared spectroscopy, Stars), Line spectrum, Spectra (Visible + ultraviolet), Spectra (Infrared).
Identifiers: Arcturus.

Research is described as a progress report on the construction of a non-gray model atmosphere for the K2IIIp giant Arcturus including the effects of line blanketing. The report covers: (a) a description of preliminary model atmosphere construction and outline of further analysis which will lead to final model; (b) a report on the analysis of infrared spectrograms of Arcturus (12,000-25,000A) fur-

nished by Drs. P. and J. Connes, and obtained by Fourier transform spectroscopy; and, (c) a report on the analysis of unpublished photometric atlas of Arcturus (3500-12,000A) furnished by Drs. R. and R. Griffin.
AD-655 663 HC$3.00 MF$0.65

ON THE COSMOLOGICAL DISTORTION EFFECT.
Final rept.,
Washburn Observatory Madison Wis
Jerome Kristian. 25 Aug 66, 6p
Grant Nonr (G)-00059-65
Availability: Published in The Astrophysical Journal v147 n3 p864-7 Mar 1967.

Descriptors: (*Astronomy, Measurement), (*Astrophysics, Mathematical analysis), Galaxies, Distribution functions, Algebraic topology, Distortion, Anomalies, Gravity, Models (Simulations).
Identifiers: Redshift.

Detailed equations for the effect are given, and an unsuccessful attempt to measure it on 200-inch photographs of clusters of galaxies is described. The results give an upper limit of 2 x 10 to the -18th power year (-2 power) for all components of the incident magnetic-type gravitational field and 0.6 x 10 to the -18th power year (-2 power) for at least some of them. These numbers are not very stringent tests of the Friedmann and steady-state models, but seem to be about the best that can be done with this kind of measurement. (Author)
AD-655 718 Not available from CFSTI.

INVERSE COMPTON RADIATION IN QUASI-STELLAR OBJECTS,
Columbia Univ New York Dept of Astronomy
J. Woltjer. 22 Aug 66, 6p
AFOSR-67-1668
Contract AF 49 (638)-1358
Availability: Published in Astrophysical Journal v146 n2 p597-9 Nov 1966.

Descriptors: (*Extraterrestrial radio waves, Sources), (*Compton scattering, Astrophysics), Magnetic fields, Electrons, Particle trajectories, Photons.
Identifiers: Quasars.

In a recent Note Hoyle, Burbidge, and Sargent (1966) (referred to subsequently as 'HBS') have discussed the energy losses for electrons in quasi-stellar objects (QSO) caused by the inverse Compton effect. They concluded that if the QSO are at cosmological distances the inverse Compton loss would exceed the synchrotron radiation loss by a large factor unless the magnetic field were very strong. But if the field is so strong, the lifetime of the electrons becomes a matter of seconds. If the infrared and radio radiation of the QSO is taken to be synchrotron radiation, the physical situation thus becomes difficult to understand. HBS show that if the QSO are placed nearer (approximately 10 Mpc) the difficulties are greatly reduced, and they consider this an almost decisive argumentin favor of a local theory for the QSO. In the following we will show that this argument depends strongly on the assumed isotropy of the relativistic electrons and that, when the electrons move in a narrow cone (approximately 10 deg.) around the field lines of a radical field, the difficulties are eliminated. (Author)
AD-655 729 Not available from CFSTI.

ISOTROPY OF COSMIC BACKGROUND RADIATION AT 10,690 MHz,
Stanford Univ Calif Radio Astronomy Inst
E. K. Conklin, and R. N. Bracewell. 13 Feb 67, 3p Rept no. 45
AFOSR-67-1710
Contract AF 49 (638)-1375
Availability: Published in Physical Review Letters v18 n15 p614 Apr 10 1967.

Descriptors: (*Thermal radiation, Microwaves), Blackbody radiation, Measurement, Temperature, Anisotropy, Anomalies.

The microwave background radiation from the sky at 10,690 MHz is structureless to less than one-fifth of one per cent an angular scale of the order of 1 degree. (Author)
AD-655 732 Not available from CFSTI.

EXTRATERRESTRIAL CIVILIZATIONS.
Israel Program for Scientific Translations, Ltd., Jerusalem.
G. M. Tovmasyan. 1967, 133p NASA-TT-F-438, TT-67-51373
Transl. Into English From the Publ. "vnezemnye Tsivilizatsii" Erevan, Izd. Akad. Nauk Arm. Ssr, 1965 P 1-99 Proc. of the 1st All-union Conf. on Extraterrest. Civilizations and Interstellar Commun., By Urakan, 20-23 May 1964 Published for Nasa and Nsf

Descriptors: *Conference, *Extraterrestrial life, *Interplanetary communication, *Radio communication, Astronomy, Communication, Detection, Extraterrestrial, Interplanetary, Language, Life, Radio, Reception, Signal, Source, Transmission, U.S.S.R..

For abstract, see STAR 05 17.
N67-30330 HC$3.00 MF$0.65

GEOMETRICAL MODEL OF CALCULATION OF PLANET REFLECTED SOLAR THERMAL FLUXES.
Geometricheskaya Model Rascheta Otrazhennykh Ot Planety Solnechnykh Teplovykh Potokov
Volt Technical Corp., Washington, D. C.
V. I. Krasovskiy. 18 May 67, 4p NASA-CR-84858, ST-OA-SA-10609
Contract NAS5-12487
Transl. Into English From Kosmich. Issled. (Moscow), V. 5, No. 2, 1967 P 308-310

Descriptors: *Mathematical model, *Planetary radiation, *Reflected ray, *Solar flux, *Thermal radiation, Calculation, Factor, Flux, Geometry, Lambert law, Magnitude, Mathematics, Model, Planetary, Radiation, Ray, Reflection, Scattering, Solar, Surface, Thermal.

For abstract, see STAR 05 17.
N67-30621 HC$3.00 MF$0.65

PHASE MEASURING DEVICE FOR DETERMINING THE POLARISATION LEVEL OF STAR LIGHT.
Phasenmessgeraet Zur Bestimmung Der Polarisationsebene Von Sternlicht
Specola Vaticana (Vatican City). Laboratorio Astrofisico.
W. Bitterlich, and E. W. Salpeter. 1966, 13p
City/, V. 3, No. 5, 1966 P 213-224 in German, English Summary

Descriptors: *Electronic equipment, *Phase control, *Polarimeter, Angle, Control, Conversion, Current, Electronic, Equipment, High speed, Light, Phase, Photomultiplier, Pulse, Signal, Star.

For abstract, see STAR 05 17.
N67-30697 HC$3.00 MF$0.65

THIRTY YEAR SPECTRUM ATLAS OF THE ASTROPHYSICAL LABORATORY OF THE VATICAN OBSERVATORY.
Specola Vaticana (Vatican City). Laboratorio Astrofisico.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 17.
N67-30698 HC$3.00 MF$0.65

WAYS OF PREVENTING SUPERPOSITION IN GRATING SPECTRA.
Wege Zur Verhuetung Von Ueberlagerungen in Gitterspektren
Specola Vaticana (Vatican City). Laboratorio Astrofisico.
J. Junkes, and E. W. Salpeter. 1967, 40p
City/, V. 3, No. 6, 1967 P 225-264 Refs in German, English Summary

Descriptors: *Dispersion, *Grating, *Spectrograph, Addition, Cross, Crystal, Method, Optics, Prevention, Prism, Slit, Spectroscope, Spectrum, Superposition.

For abstract, see STAR 05 17.
N67-30700 HC$3.00 MF$0.65

THE LARGE GLASS PRISM SPECTROGRAPH G 80 OF A. GATTERER.
Der Grosse Glas-prismen-spektrograph G 80 Von A. Gatterer
Specola Vaticana (Vatican City). Laboratorio Astrofisico.
J. Junkes, and E. W. Salpeter. 1966, 28p
City/, V. 3, No. 2, 1966 P 38-63 Refs in German, English Summary

Descriptors: *Engineering development, *Prism, *Spectrograph, Astronomy, Astrophysics, Development, Engineering, Focus, High dispersion, Instrument, Laboratory, Light, Passage, Spectrum.

For abstract, see STAR 05 17.
N67-30701 HC$3.00 MF$0.65

THE 534 CM EBERT- FASTIE SPECTROGRAPH OF THE ASTROPHYSICAL LABORATORY.
Der 534 Cm-ebert-fastie-spektrograph des Astrophysikalischen Laboratoriums
Specola Vaticana (Vatican City). Laboratorio Astrofisico.
J. Junkes, and E. W. Salpeter. 1966, 48p
City/, V. 3, No. 3, 1966 P 163-211 Refs in German, English Summary

Descriptors: *Astrophysics, *Ebert spectrometer, Angle, Design, Field, Flat, Focusing, Grating, High resolution, Instrument, Mirror, Performance, Spectrograph, Spectrometer, Spectrum, Surface.

For abstract, see STAR 05 17.
N67-30703 HC$3.00 MF$0.65

DIRECT MEASUREMENTS OF INTERPLANETARY MAGNETIC FIELD AND PLASMA.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
N. F. Ness. Jun 67, 49p NASA-TM-X-55830, X-612-67-293
Presented At qsy/Cospar Symp., London, England, 18 Jul. 1967

Descriptors: *Imp, *Interplanetary magnetic field, *Physical property, *Pioneer space probe, *Solar plasma, Corona, Density, Direct, Field, Flux, Interplanetary, Magnetic, Mariner spacecraft, Measurement, Physical, Plasma, Property, Solar, Source, Temperature, Vela project, Velocity, Wind.

For abstract, see STAR 05 17.
N67-30745 HC$3.00 MF$0.65

THEORY OF STELLAR SPECTRA.
National Aeronautics and Space Administration, Washington, D. C.
V. V. Sobolev. Jun 67, 311p NASA-TT-F-457
Transl. Into English of the Book "teoriya Zvezdnykh Spektrov" Moscow, Izd. Nauka, 1966 P 1-279

Descriptors: *Celestial body, *Far ultraviolet, *Interstellar material, *Star field, *Stellar spectrum,

Atmosphere, Atom, Body, Celestial, Diffusion, Field, Fixed, Gas, Heat, Interstellar, Layer, Material, Model, Nonstationary, Optical, Probability, Radiative, Spectrum, Star, Stellar, Theory, Transfer, Transition.

For abstract, see STAR 05 17.
N67-31016 HC$3.00 MF$0.65

RADIO FREQUENCY NOISE EMISSION FROM ORBITING PROTONS.
Minnesota Univ., Minneapolis.
H. Heffner. Aug 66, 13p NASA-CR-85803, TG-25
Contract NSR-24-005-047

Descriptors: *Charged particle, *Cosmic dust, *Galaxy, *Proton, *Radio noise, Charge, Cosmic, Dust, Emission, Intergalactic, Noise, Orbital, Particle, Radiation, Radio.

For abstract, see STAR 05 17.
N67-31052 HC$3.00 MF$0.65

DISCUSSION OF RADIO WAVE PROPAGATION EXPERIMENTS TO EXPLORE THE EARTH'S MAGNETOSPHERE.
Minnesota Univ., Minneapolis.
For primary bibliographic entry see Field 20N.
For abstract, see STAR 05 17.
N67-31164 HC$3.00 MF$0.65

DIFFUSION OF HEAVY IONS IN THE SOLAR CORONA.
Maryland Univ., College Park. Dept. of Physics and Astronomy.
Y. J. Alloucherie. Apr 67, 119p NASA-CR-84852
Grant NSG-220-62

Descriptors: *Corona, *Dynamic model, *Heavy ion, *Solar plasma, Asymptote, Conservation, Density, Diffusion, Dynamic, Electron, Equation, Flow, Heavy, Hydrogen, Ion, Mass, Model, Momentum, Plasma, Proton, Solar, State, Steady, Temperature, Velocity.

For abstract, see STAR 05 17.
N67-31210 HC$3.00 MF$0.65

SURVEY OF SOLAR CYCLE PREDICTION MODELS.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
For primary bibliographic entry see Field 2B.
For abstract, see STAR 05 17.
N67-31334 HC$3.00 MF$0.65

THE COMPOSITION OF THE TERRESTRIAL PLANETS.
Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
D. L. Anderson. Aug 66, 13p NASA-CR-85855, TG-20
Contract NSR-24-005-047

Descriptors: *Meteorite density, *Planetary constitution, *Silicate, Atom, Chondrite, Composition, Constitution, Density, Distribution, Earth, Iron, Mars (planet), Meteorite, Mineral, Planetary, Probe, Terrestrial, Trajectory, Venus, Weight.

For abstract, see STAR 05 17.
N67-31374 HC$3.00 MF$0.65

LUNAR SURFACE ROUGHNESS SHADOWING AND THERMAL EMISSION.
Minnesota Univ., Minneapolis. Tycho Study Group.
B. G. Smith. Aug 66, 28p NASA-CR-85830, TG-27
Contract NSR-24-005-047

Descriptors: *Lunar surface, *Statistical analysis, *Surface roughness, Analysis, Astrophysics, Characteristics, Emission, Infrared, Lunar, Measurement, Model, Photography, Roughness, Satellite, Shadow, Slope, Statistical, Surface, Theory.

For abstract, see STAR 05 17.
N67-31378 HC$3.00 MF$0.65

GRAVITATIONAL AND PHASE CHANGE SOURCES OF ENERGY IN JUPITER.
Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
R. Smoluchowski. Aug 66, 16p NASA-CR-85851, TG-28
Contract NSR-24-005-047

Descriptors: *Energy source, *Gravitational effect, *Jupiter (planet), *Phase change, Change, Conduction, Diffusion, Effect, Elastic, Energy, Equation, Gravitational, Helium, Hydrogen, Model, Molecular, Phase, Source, Strain, Thermal.

For abstract, see STAR 05 17.
N67-31395 HC$3.00 MF$0.65

EARLY THERMAL HISTORY OF THE TERRESTRIAL PLANETS.
Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
D. L. Anderson, and R. A. Phinney. Aug 67, 30p NASA-CR-85848, TG-21
Contract NSR-24-005-047

Descriptors: *Earth mantle, *Lunar composition, *Mars (planet), *Planetary evolution, Age, Composition, Core, Crust, Earth, Evolution, Field, History, Lunar, Magnetic, Mantle, Melting, Planetary, Point, Radiation, Radioactivity, Silicate, Surface, Terrestrial, Thermal.

For abstract, see STAR 05 17.
N67-31396 HC$3.00 MF$0.65

ON LUNAR "TEMPERATURES".
Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
J. J. Hopfield. Aug 66, 14p NASA-CR-85850, TG-26
Contract NSR-24-005-047

Descriptors: *Lunar surface, *Radio emission, *Temperature measurement, Dirt, Eclipse, Emission, Lunar, Measurement, Noise, Photograph, Radio, Rock, Signal, Surface, Surveyor i spacecraft, Temperature, Thermal, Wavelength.

For abstract, see STAR 05 17.
N67-31397 HC$3.00 MF$0.65

DESCRIPTION OF SCIENTIFIC SOUNDING-ROCKET PROJECT S-11.
European Space Research Organization, Paris (France).
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 17.
N67-31405 HC$3.00 MF$0.65

GAMMA-RAY ASTRONOMY WITH A DIGITIZED SPARK CHAMBER.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
T. L. Cline, C. H. Ehrmann, C. E. Fichtel, D. A. Kniffen, and R. W. Ross. Jul 67, 12p NASA-TM-X-55831, X-6111-67-326

Descriptors: *Balloon flight, *Cosmic radiation, *Gamma radiation, *Magnetic core, *Point source, *Radiation detector, *Spark chamber, Balloon, Cerenkov counter, Chamber, Core, Cosmic, Detector, Digital, Electron, Energy, Flight, Gamma, High altitude, Magnetic, Pair, Photon, Plastic, Point, Radiation, Scintillator, Source, Spark.

For abstract, see STAR 05 17.
N67-31421 HC$3.00 MF$0.65

SIMULTANEOUS OBSERVATIONS OF SOLAR PROTONS INSIDE AND OUTSIDE THE MAGNETOSPHERE PROGRESS REPORT.
State Univ. of Iowa, Iowa City. Dept. of Physics and Astronomy.
T. P. Armstrong, S. M. Krimigis, and J. A. Van Allen. Apr 67, 16p NASA-CR-84853, REPT.-67-13
Contract NAS5-9076, Grant NSG-233-62

Descriptors: *Explorer xxxiii satellite, *Injun satellite, *Satellite observation, *Solar proton, Detector, Earth, Flare, Inside, Interplanetary, Magnetosphere, Observation, Outside, Proton, Satellite, Solar, Space.

For abstract, see STAR 05 17.
N67-31448 HC$3.00 MF$0.65

SOLAR RADIO FLUX OBSERVED AT UNIVERSITY PARK, PENNSYLVANIA, OCTOBER-NOVEMBER-DECEMBER 1966,
Pennsylvania State Univ., University Park. Radio Astronomy Observatory.
John P. Hagen. Jun 67, 35p Scientific-008
Grant NSF-GA-720
See also PB-175 616.

Descriptors: (*Radio astronomy, Sun), (*Solar radiation, Radio waves), Radiometers, Tracking, Antennas, Tables.

This report contains solar radio flux data recorded at 10,700 Mc/s, 2,700 Mc/s, 960 Mc/s and 328 Mc/s during the quarter 1 October 1966 to 31 December 1966. A table of distinct events is also given. (Author)
PB-175 602 HC$3.00 MF$0.65

SOLAR RADIO FLUX OBSERVED AT UNIVERSITY PARK, PENNSYLVANIA, JULY-AUGUST-SEPTEMBER 1966,
Pennsylvania State Univ., University Park. Radio Astronomy Observatory.
John P. Hagen. Mar 67, 32p Scientific-007
Grant NSF-GA-720
See also PB-173 799.

Descriptors: (*Radio astronomy, Sun), (*Solar radiation, Radio waves), Radiometers, Tracking, Antennas, Measurement, Tables.

This report contains solar radio flux data recorded at 10,700 Mc/s, 2,700 Mc/s, 960 Mc/s and 328 Mc/s during the quarter 1 July 1966 to 30 September 1966. A table of distinct events is also given. (Author)
PB-175 616 HC$3.00 MF$0.65

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

SHOCK PROPAGATION IN NONHOMOGENEOUS ATMOSPHERES AND MODIFIED SACHS SCALING. PART I: EXPONENTIAL IDEAL-GAS ATMOSPHERE,
Naval Ordnance Lab White Oak Md
Morton Lutzky, and Delbert L. Lehto. 19 Jun 67, 21p Rept no. NOLTR-67-20

Descriptors: (*Shock waves, Propagation), (*Atmosphere, Shock waves), Scale, Mathematical analysis, Pressure.

A scaling procedure is presented for the case of a shock in a spherically symmetric, exponential, ideal-gas atmosphere. This scaling procedure allows a very convenient systemization of the shock pressure-distance curves and leads to a simple method for the investigation of the validity of modified Sachs scaling. It is found that modified Sachs scaling yields pressure-distance curves which are in excellent agreement with results obtained by hydrodynamic code calculations, except in the region where the minimum in overpressure occurs. In this region the deviation is at most 20 per cent. Some comments are made on the applicability of these results to shocks in a horizontally stratified atmosphere. (Author)
AD-655 229 HC$3.00 MF$0.65

SOME CONSIDERATIONS IN THE OPERATIONAL CLASSIFICATION OF SUDDEN IONOSPHERIC DISTURBANCES AND COMPUTATION OF PEAK INCREASED ABSORPTION ON HF CIRCUITS.
Booz-Allen Applied Research Inc Bethesda Md
17 Jan 66, 49p Rept no. BAARINC-800-9-4
Contract NObsr-93296

Descriptors: (*Ionospheric disturbances, Solar flares), (*Ionospheric propagation, Ionospheric disturbances), High frequency, Very low frequency, Anomalies, Phase, Ionization, Electron density, Absorption.

The report reviews various approaches to the application of sudden phase anomaly (SPA) data derived at very low frequency (VLF) to the operational estimation of increased high frequency (HF) absorption resulting from solar flares. The means of categorizing 'weak' and 'strong' SPA events originally devised by Chilton is described. Within the 'strong' category, five further classifications relative to the ratio of D-layer ionization densities before and at the peak of a flare event are proposed because this ratio is related to the geographic coverage of the event and the maximum downward shift of the D-layer effective reflecting height. The relationship of HF absorption to associated SPA data is concluded to depend upon the electron density and collision frequency profiles produced by a flare. Calculation of enhanced HF absorption for a postulated flare event and HF path is demonstrated by the use of an empirical relationship. (Author)
AD-655 254 HC$3.00 MF$0.65

THE STRUCTURE AND COMPOSITION OF THE STRATOSPHERE AND IONOSPHERE,
American Meteorological Society Boston Mass
I. A. Khvostikov. Jan 53, 21p Rept no. T-R-13
TT-67-62358
Contract AF 19 (604)-203
Stroenie i Sostav Stratosfery i Ionosfery, trans. of Akademiya Nauk SSSR. Vestinik, v18 n1 p17-31 1948.

Descriptors: (*Stratosphere, Reviews), (*Ionosphere, Reviews), (*Atmospheric temperature, Anomalies), Radiosondes, Tropopause, Troposphere, Radio waves, Absorption spectrum, Turbulence, Terrestrial magnetism, Atmospheric motion, Transport properties, Atmosphere models, Ozone, Twilight, Water vapor, Aurorae, Meteorological phenomena.

Contents: The stratosphere; Theory of the stratosphere; Water vapor in the stratosphere; Ozone in the stratosphere; The temperature of the upper layers of the atmosphere; The ionosphere; The composition of the air in the ionosphere and the problem of vertical mixing; The ionosphere and the sun; The temperature of the ionosphere; Wind in the stratosphere; The stratosphere and weather.
AD-655 337 HC$3.00 MF$0.65

RADIATION BELTS OF THE EARTH USING SOVIET EARTH SATELLITE AND COSMIC ROCKETS 1957-1959,
Foreign Technology Div Wright-Patterson AFB Ohio
P. V. Vakulov, E. V. Gorchakov, and Yu. I. Logachev. 18 Apr 67, 138p Rept no. FTD-MT-65-417 TT-67-62362
Radyatsionnye Poyasa Issledovaniyam na Sovetshikh Issusstvennykh Sputnikakh i Kosmicheskikh Raketakh 1957-1959, edited machine trans. of Kosmicheskie Luchi, (USSR) (17) n6 p1-114 1965.

Descriptors: (*Van Allen radiation belt, Scientific satellites), (*Space environmental conditions, Scientific research), Radiation measurement systems, Magnetosphere, Cosmic rays, Space probes, Analysis, Measurement.

The translation describes the investigations of radiation, carried out by a group of colleagues of Moscow State University and the Physical Institute of the Academy of Sciences of the USSR under the leadership of S. N. Vernov and A. Ye. Chudakov, with the help of Soviet artificial earth satellites and space rockets launched in the (IGY) period during 1957-1959. For the considered period in the Soviet Union investigations of radiation were produced using two artificial satellites and three space rockets. As a result, considerable experimental material has been accumulated which has nowhere been systematically published. The subsequent chapters give a survey of results of these investigations, a detailed description of the equipment used, and the methods of transmission.
AD-655 364 HC$3.00 MF$0.65

KINETIC AND SPECTROSCOPIC CONSTRAINTS ON THE ORIGIN OF THE N2 AFTERGLOW,
Aerospace Corp El Segundo Calif Labs Div
For primary bibliographic entry see Field 7E.
AD-655 378 HC$3.00 MF$0.65

IONOSPHERIC RESEARCH USING SATELLITES.
Annual scientific rept. no. 2,
National Committee for Space Research Haifa (Israel) Radio Observatory
Jonathan Mass, and Zwi. Houminer. 28 Feb 67, 35p
AFCRL-67-0355
Contract AF 61 (052)-837
See also AD-634 910.

Descriptors: (*Electron density, Ionosphere), (*Atmospheric sounding, *Satellites (Artificial)), Diurnal variations, Sunspots, Solar disturbances, Magneto-optic effect, Magnetic fields, Anomalies.

The ionospheric electron content above Haifa was determined for the period November 1964 - June 1966. The results reveal the expected diurnal variation, with midday maximum occurring between 13-14 hours local time. The ratio of the day-time maximum to night-time values of electron content is between 8-10 and is similar for all seasons. There is a marked seasonal and solar activity dependence. Maximum electron content values occur at the equinoxes and minimum at winter. The variation of the electron content with the mean Zurich sunspot number R is given approximately by the relation N sub t is proportional to 1 + 0.029 R. On several revolutions of the S-66 satellite, a strong change in the Faraday fading rate of the 40 and 41 Mc/s signals was observed for geometrically similar conditions. This change in Faraday rate is thought to be related to large scale, magnetic field aligned irregularities featuring local reduction in electron density. The irregularities were found to be located at about 17 degrees N latitude having thickness of about 60 km and average height close to F2 maximum. The reduction in the total content in the irregularity is of the order of 6%. (Author)
AD-655 392 HC$3.00 MF$0.65

AURORAL ZONE IONOSPHERIC RESEARCH.
Final scientific rept. 1 Mar 63-31 Mar 67,
Kiruna Geophysical Observatory (Sweden)
Ludwik Liszka. 23 May 67, 18p
AFCRL-67-0416
Contract AF 61 (052)-678

Descriptors: (*Satellites (Artificial), *Ionospheric disturbances), Geophysics, Electrons, Scintillation, Diffraction, Periodic variations, Rotation, Velocity, Radio waves, Radio transmission.
Identifiers: Auroral zone.

During years 1963-66 transmissions from satellites: Transit 4A and S-66 were recorded at Kiruna (68 degrees N, 20 degrees E), Sweden and used for studies of ionospheric irregularities and ionospheric electron content. Most important results of the studies obtained during the report period are presented. (Author)
AD-655 393 HC$3.00 MF$0.65

A NEW SPECTROPHOTOMETER FOR MEASURING ULTRAVIOLET SKY BRIGHTNESS AND DIRECT SOLAR RADIATION.
Physikalisch-Meteorologisches Observatorium Davos Davos-Platz (Switzerland)
For primary bibliographic entry see Field 20F.
AD-655 394 HC$3.00 MF$0.65

NUMBER DENSITY DETERMINATION IN THE ATMOSPHERE OF O2, H2O AND CO2 GAS CONSTITUENTS BY USE OF A HIGH INTENSITY LASER BEAM,
Texas Univ Austin Dept of Electrical Engineering
D. L. Dobbins, and A. H. LaGrone. 1967, 13p
AFOSR-67-1591
Grant AF-AFOSR-766-67
Availability: Published in 1967 SWIEEECO RECORD nF-72 p5-3-1-10 Apr 19 1967.

Descriptors: (*Absorption spectrum, Atmosphere), (*Probes, Lasers), (*Atmosphere, Gases), Line spectrum, Oxygen, Nitrogen, Water vapor, Scattering, Carbon dioxide.

A method is developed whereby number densities of several of the atmospheric gas constituents may be determined as a function of altitude. The method dictates the use of two laser wavelengths, one occurring in an absorption region of the gas in consideration and one occurring in a spectral region where no absorption takes place. Returned scattered signals are collected and used along with absorption line strength and line width to determine the number density. The method described affords an indirect way of determining number densities of a specific constituent of the atmosphere by electromagnetic probing. (Author)
AD-655 401 Not available from CFSTI.

DISPERSIVE WAVES IN THE UPPER ATMOSPHERE,
Pennsylvania State Univ University Park Ionosphere Research Lab
David P. Hoult. 1967, 10p
AFOSR-67-1626
Contract AF 49 (638)-1708, Grant NsG-134-61
Availability: Published in Space Research v7 p1059-67 1967.

Descriptors: (*Atmospheric motion, Upper atmosphere), Correlation techniques, Turbulence, Puerto Rico, Statistical analysis, Gravity, Scattering.
Identifiers: Acoustic waves.

Using a correlation technique, statistical properties of dispersive acoustic waves in the upper atmosphere are studied. Included are the mathematical description of the technique, an example of how the correlation function for acoustic waves behaves, and data from the radar at Arecibo, Puerto Rico. A rough correlation between the example and the data exists. The intensity of these waves

decreases markedly above 100 km. (Author)
AD-655 487 Not available from CFSTI.

WORLD MAPS OF CONJUGATE COORDINATES AND L CONTOURS,
Institute for Telecommunication Sciences and Aeronomy Boulder Colo
W. H. Campbell, and S. Matsushita. 1967, 9p
Prepared in cooperation with High Altitude Observatory, Boulder, Colo.
Availability: Published in J. Geophys. Res. v72 1 Jul 67.

Descriptors: (*Magnetosphere, Terrestrial magnetism), (*Terrestrial magnetism, Particle trajectories), Computer programs, Electromagnetic wave reflections, Maps, Atmosphere models.
Identifiers: Conjugate coordinates.

The report gives plots of conjugate locations and L values for 10 degrees geographic latitude and longitude intersections for 100 km altitudes above the earth's surface, of field sites geomagnetically conjugate to all world positions.
AD-655 661 Not available from CFSTI.

DISCUSSION OF PAPER BY R. C. WENTWORTH, 'EVIDENCE FOR MAXIMUM PRODUCTION OF HYDROMAGNETIC EMISSIONS ABOVE THE AFTERNOON HEMISPHERE OF THE EARTH,
Institute for Telecommunication Sciences and Aeronomy Boulder Colo
John A. Dawson. 27 Jun 66, 3p
ARPA Order-183
Availability: Published in Journal of Geophysical Research v72 n7 p2048-50 Apr 1 1967.

Descriptors: (*Ionospheric disturbances, Electromagnetic waves), Sunspots, Solar disturbances, Diurnal variations, Terrestrial magnetism, Attenuation, Electrons.
Identifiers: Micropulsations, Hydromagnetic waves.

Data taken at Boulder Colorado were used to check the hypothesis that ionospheric attenuation is responsible for the latitude variation in diurnal activity of Pc 1's (regular pulsations with period between 0.2 and 5 seconds).
AD-655 665 Not available from CFSTI.

AN ANALYSIS OF THE MAGNETIC EFFECT FROM SHOWER METEORS,
Institute for Telecommunication Sciences and Aeronomy Boulder Colo
Richard G. Green. 5 Dec 66, 5p
ARPA Order-183
Availability: Published in Journal of Geophysical Research v72 n9 p2309-13 May 1 1967.

Descriptors: (*Meteors, Magnetic properties), (*Ionospheric disturbances, Terrestrial magnetism), Upper atmosphere, Peru, Rhode Island, Mathematical analysis, Measurement.
Identifiers: Geminid meteors, Micropulsations.

Magnetic effects due to the passage of the Geminid meteors through the ionosphere were computed using an equation derived by Chapman and Ashour. The observed micropulsation activity at Jicamarca, Peru, and Kingston, Rhode Island, was compared with the predicted value. No striking similarity was found either in magnitude or phase. An amplitude comparison shows an observed result 150 times greater than predicted for Jicamarca and five times greater than predicted for Kingston. The best comparison of predictions with data was restricted to a phase maxima at 2300 and 0530 LT. (Author)
AD-655 666 Not available from CFSTI.

COSMIC-RAY PARTICLES THAT CHANGED FROM 1954 TO 1958 TO 1965.
Revised ed.,
California Inst of Tech Pasadena
H. V. Neher. 14 Nov 66, 13p
Contract Nonr-220 (53), Grant NsG-426
Revision of manuscript submitted 15 Jun 66.
Availability: Published in Journal of Geophysical Research v72 n5 p1527-39 Mar 1 1967.

Descriptors: (*Cosmic rays, Measurement), Isotope availability, Protons, Balloons, Intensity, Solar disturbances, Solar radiation.

During each of the two recent periods of special international coordination of scientific effort, the IGY and the IQSY, we made a latitude survey of cosmic rays, using ionization chambers carried by balloons. All instruments were carefully compared with the same set of standards. In each case, simultaneous balloon flights were made from a high-latitude base station. Such monitoring of the primary radiation allowed corrections to be made to the data from the mobile station. Ratios of the abundances of the different nuclei to that of protons in the primaries as found by other observers have been used to separate out the effect due only to protons. Two methods are used to find the differential spectrum of the protons for the different years. Above 1 bev, the areas under successive latitude difference curves are used. This method takes advantage of the earth's magnetic field as an analyzer. Below about 0.6 bev the ranges of protons in air and areas are used. The two methods give results that are consistent with each other. From the integral of the differential spectra so derived for the different years, it is found that the total number of primary protons increased by a factor of 3.1 between 1958 and 1965. From similar flights made during the previous solar minimum the change from 1954 to 1958 is found to be a factor of 4.2. This, as well as solar activity data, indicates that there was more residual modulation of the primary cosmic radiation during the 1965 minimum than was present in 1954.
AD-655 668 Not available from CFSTI.

NEW MODEL ATMOSPHERES GIVING LATITUDINAL AND SEASONAL VARIATIONS IN THE THERMOSPHERE.
Air Force surveys in geophysics no. 194,
Air Force Cambridge Research Labs L G Hanscom Field Mass
K. S. W. Champion, F. A. Marcos, and J. Slowey.
Jun 67, 35p Rept no. AFCRL-67-0330
Prepared in cooperation with Smithsonian Astrophysical Observatory, Cambridge, Mass.

Descriptors: (*Atmosphere models, *Ionosphere), Density, Exosphere, Atmospheric temperature, Standards, Polar regions, Diurnal variations, Scientific satellites.
Identifiers: Thermosphere.

A set of model atmospheres was prepared which constitutes a major advance in the representation of systematic variations in atmospheric properties between 120 and 250 km. The new models have three sets of boundary conditions at 120 km, which represent idealized variations with season and latitude, and connect with the new low altitude models which are a function of season and latitude. The three sets of high altitude models merge into one set above about 250 km. This set is identical with Jacchia's latest models and is a function of the usual parameters, including time of day, solar flux and geomagnetic index. The new models appear to be in reasonable agreement with available experimental data. The theory predicts variations in the number densities of the individual constituents. An unexpected result is the prediction that the ratios of the constituents (such as O to O2) also vary, even at the boundary altitude.
AD-655 775 HC$3.00 MF$0.65

EXTENSION TABLES FOR THE U. S. STANDARD ATMOSPHERE, 1962, WITH SPECIAL ATTENTION TO THE CALCULATION OF GEOPOTENTIAL,
Gca Corp Bedford Mass Gca Technology Div
R. A. Minzner. Jan 67, 42p Rept no. Scientific-3, GCA-TR-67-1-A
AFCRL-67-0335
Contract AF 19 (628)-6085

Descriptors: (*Atmosphere models, Upper atmosphere), (*Upper atmosphere, Standards), Barometric pressure, Density, Atmospheric temperature, Tables, Thermodynamics, Computer programs.
Identifiers: Geopotential.

The need for both metric-unit and English-unit tables as a function of integral multiples of specific numbers of geopotential meters for altitudes above 90 kilometers has prompted a new set of calculations, which required the use of equations not specifically presented in the United States Standard Atmosphere, 1962. The development of these equations is discussed and the value of all constants employed are given. The calculations involve a transformation between geopotential and geometric altitude, and the development of an empirical analytical expression relating these quantities is presented. This empirical function yields results which differ by less than 0.1 meter at 700 km altitude, from those computed in an unspecified manner for the United States Standard Atmosphere, 1962.
AD-655 779 HC$3.00 MF$0.65

THE DYNAMICS OF THE STRATOSPHERE DURING THE 1958 WARMING,
Florida State Univ Tallahassee Dept of Meteorology
W. Alan Bowman. 1 Jul 67, 138p Rept no. Scientific-2, 67-2
AFCRL-67-0366
Contract AF 19 (628)-4953

Descriptors: (*Stratosphere, Atmospheric temperature), (*Upper atmosphere, Dynamics), Theses, Atmospheric motion, Turbulence, Fluid dynamic properties, Northern hemisphere, Air mass analysis.

Within the period from January 18 to February 10, 1958, a stratospheric warming occurred in the Northern Hemisphere. Maps of height and temperature for 100, 50 and 25 mb illustrate the onset of the warming in the region of the warm belt and the subsequent migration of the warm center across western Europe, Iceland and Canada. Vertical motion at 100, 50 and 25 mb was computed by the adiabatic method. Horizontal divergence at 100, 75 and 50 mb was computed. Vorticity and the vorticity budget at 100, 50 and 25 mb were evaluated. A numerical experiment was performed in which 25-mb temperatures were computed using data primarily at 100 and 50 mb. The computed values were found to be better than those obtained by a straightforward extrapolation scheme, particularly near the height of the warming.
AD-655 780 HC$3.00 MF$0.65

GENERALIZED MAGNETO-IONIC THEORY FOR STRONG ELECTRIC FIELDS,
Brandeis Univ Waltham Mass Dept of Physics
For primary bibliographic entry see Field 20I.
AD-655 788 HC$3.00 MF$0.65

THE DEVELOPMENT OF A GERDIEN CONDENSER FOR SOUNDING ROCKETS,
Utah Univ Salt Lake City Upper Air Research Labs
David A. Burt. May 67, 55p Rept no. Scientific-8, UU-67-3
AFCRL-67-0343
Contract AF 19 (628)-4995
Research supported in part by DASA.

Descriptors: (*Probes ((lectromagnetic), Electrical conductance), (*Atmospheric sounding, Probes), Sounding rockets, Electron density, Ions,

Instrumentation, Measurement, Upper atmosphere, Capacitors.

Measurements of D-region conductivity are of extreme importance in understanding the basic, normal atmospheric processes as well as for investigating special events associated with the D-region, i.e., auroral absorptions, polar cap absorptions (PCA) and sudden ionospheric disturbances (SID). This report discusses the theory and possibilities of adapting one type of conductivity probe, the Gerdien condenser for operation on sounding rockets at supersonic and subsonic velocities. Details are presented for two systems developed for making correlating measurements during simultaneous rocket flights. The first is designed for the Black Brant II rocket (supersonic flow); and the second, employing a parachute system, is designed for the Arcas rocket (subsonic flow). (Author)
AD-655 808 HC$3.00 MF$0.65

EXPERIMENTAL STUDIES OF THE STRUCTURE OF THE IONOSPHERIC D-REGION.
Norwegian Defence Research Establishment, Kjeller.
E. V. Thrane. Oct 66, 95p NDRE-54

Descriptors: *D layer, *Density measurement, *Diurnal variation, *Ionospheric electron density, *Lower ionosphere, *Solar activity effect, Activity, Bibliography, Collision, Cooling, Cross, Density, Diurnal, Effect, Electron, Frequency, Ionosphere, Ionospheric, Latitude, Lower, Measurement, Modulation, Neutral, Partial, Pulse, Reflection, Season, Solar, Theory, Undisturbed, Variation.

For abstract, see STAR 05 17.
N67-30422 HC$3.00 MF$0.65

STUDIES OF THE IONOSPHERIC D-REGION BY MEANS OF A CROSS MODULATION AND PARTIAL REFLECTION TECHNIQUE FINAL TECHNICAL REPORT.
Norwegian Defence Research Establishment, Kjeller.
B. Bjelland, A. Haug, E. V. Thrane, and E. Tsagakis. Nov 66, 47p NDRE-53

Descriptors: *D layer, *International quiet sun year (iqsy), *Ionospheric electron density, *Modulation technique, Cross, Density, Disturbance, Electron, Free, Interaction, International, Ionospheric, Iqsy, Modulation, Partial, Quiet, Radio, Reflection, Sudden, Sun, Technique, Wave, Year.

For abstract, see STAR 05 17.
N67-30449 HC$3.00 MF$0.65

AERONOMICAL INCURSION UP TO 50.000 KM.
Incursion Aeronomique Jusqu'a 50.000 Km
Institut D Aeronomie Spatiale de Belgique, Brussels.
G. Kockarts. 1967, 31p
in French, English Summary Presented At the Soc. Belg. D'astronomie, de Meteorologie Et de Phys. Du Globe, 17 Dec. 1967 Submitted for Publication Its Serial Aeronomica Acta A-52-1967

Descriptors: *Aeronomy, *Atmospheric composition, *Upper atmosphere, Activity, Atmosphere, Atmospheric, Collision, Composition, Diffusion, Exosphere, Gas, Homosphere, Particle, Solar, Structure, Upper.

For abstract, see STAR 05 17.
N67-30508 HC$3.00 MF$0.65

ESTIMATION IN MIXED FREQUENCY DISTRIBUTIONS.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
For primary bibliographic entry see Field 12A.
For abstract, see STAR 05 17.
N67-30766 HC$3.00 MF$0.65

COSMIC RAY EXPERIMENTS (ELEMENTARY PARTICLE PHYSICS) IN A MANNED ORBITING LABORATORY.
Minnesota Univ., Minneapolis.
M. Hamermesh. Aug 66, 13p NASA-CR-85839, TG-24
Contract NSR-24-005-047

Descriptors: *Elementary particle, *Manned orbital laboratory (mol), *Primary cosmic radiation, Accelerator, Beam, Collision, Cosmic, Elementary, Energetic, Experiment, High energy, Laboratory, Manned, Orbital, Particle, Primary, Radiation, Spectrum.

For abstract, see STAR 05 17.
N67-31163 HC$3.00 MF$0.65

DESCRIPTION OF SCIENTIFIC SOUNDING-ROCKET PROJECT C-09.
European Space Research Organization, Paris (France).
D. E. Page. Feb 67, 20p ESRO-SN-63

Descriptors: *Impedance probe, *Ionospheric electron density, *Langmuir probe, *Sounding rocket, Aurora, D layer, Density, Disturbance, E layer, Electron, Europe, Experiment, Faraday rotation, Impedance, Ion density, Ionospheric, Irregularity, Payload, Perturbation, Rocket, Sounding.

For abstract, see STAR 05 17.
N67-31169 HC$3.00 MF$0.65

DESCRIPTION OF SCIENTIFIC SOUNDING-ROCKET PROJECT S-08.
European Space Research Organization, Paris (France).
R. Jaeschke. Feb 67, 16p ESRO-SN-66

Descriptors: *Artificial cloud, *Barium, *Ionospheric composition, *Ozone, *Sounding rocket, *Vertical distribution, Artificial, Atmosphere, Cloud, Composition, Distribution, Europe, Experiment, Interplanetary, Ion, Ionospheric, Payload, Photocell, Photomultiplier, Probe, Radiation, Rocket, Solar, Sounding, Space, Temperature, Ultraviolet, Vertical.

For abstract, see STAR 05 17.
N67-31170 HC$3.00 MF$0.65

DESCRIPTION OF SCIENTIFIC SOUNDING-ROCKET PROJECT C-21.
European Space Research Organization, Paris (France).
J. Ortner. Feb 67, 18p ESRO-SN-61

Descriptors: *Far ultraviolet, *Monochromator, *Particle flux, *Proton, *Sounding rocket, Aurora, Detector, Electron, Europe, Experiment, Far, Flux, Geiger-mueller counter, Intensity, Light, Measurement, Particle, Payload, Photomultiplier, Rocket, Sounding, Ultraviolet.

For abstract, see STAR 05 17.
N67-31172 HC$3.00 MF$0.65

UPPER ATMOSPHERE TEMPERATURE DETERMINATION USING AL O BANDS EXCITED BY THE SUN AT TWILIGHT.
Geophysics Corp. of America, Bedford, Mass.
G. Best. May 67, 81p NASA-CR-85808, GCA-TR-67-7-N
Contract NASW-1083

Descriptors: *Aluminum oxide, *Spectral band, *Temperature measurement, *Upper atmosphere, Alkali, Aluminum, Atmosphere, Band, Energy, Intensity, Level, Line, Measurement, Metal, Meteorology, Oxide, Resonance, Spectrum, Temperature, Trail, Upper.

For abstract, see STAR 05 17.
N67-31199 HC$3.00 MF$0.65

POLAR MAGNETIC DISTURBANCES AND THE INTERPLANETARY MAGNETIC FIELD.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 17.
N67-31359 HC$3.00 MF$0.65

STUDY OF THE TEMPORAL VARIATIONS OF 40 KE V ELECTRONS IN THE MAGNETOSPHERE DURING AND AFTER THE MAGNETIC STORM ON APRIL 18, 1965 PROGRESS REPORT, MAY 1967.
State Univ. of Iowa, Iowa City. Dept. of Physics and Astronomy.
C. S. Rao. May 67, 60p NASA-CR-85905, REPT.-67-16
Grant NSG-233-62, Contract NONR-1509/06/

Descriptors: *Electron distribution, *Magnetic storm, *Magnetospheric electron density, *Trapped particle, Altitude, Density, Diffusion, Distribution, Diurnal, Electron, Geophysics, High, Injun satellite, Intensity, Low, Magnetic, Magnetosphere, Meteorology, Movement, Observation, Observatory, Orbit, Particle, Precipitation, Storm, Temporary, Variation.

For abstract, see STAR 05 17.
N67-31362 HC$3.00 MF$0.65

DESCRIPTION OF SCIENTIFIC SOUNDING-ROCKET PROJECT S-11.
European Space Research Organization, Paris (France).
R. Jaeschke. Feb 67, 17p ESRO-SN-62

Descriptors: *Cosmic radiation, *Payload, *Radiation measurement, *Sounding rocket, Albedo, Cosmic, Earth, Energy, Flight, Flux, Measurement, Organization, Radiation, Ray, Research, Rocket, Science, Sounding, Space, Stellar, Ultraviolet, X-ray.

For abstract, see STAR 05 17.
N67-31405 HC$3.00 MF$0.65

STUDIES OF THE AURORAL SUBSTORM. I - CHARACTERISTICS OF MODULATED ENERGETIC ELECTRON PRECIPITATION OCCURRING DURING AURORAL SUBSTORMS.
California Univ., Berkeley. Space Sciences Lab.
K. A. Anderson, F. V. Coroniti, R. L. Mc Pherron, and G. K. Parks. 6 Jun 67, 34p NASA-CR-85904
Grant NSG-243-62, Contract NSF GP-5583
Its Ser. 8, Iss. 45

Descriptors: *Auroral zone, *Bremsstrahlung, *Electron precipitation, *Geomagnetic storm, *X-ray scattering, Aurora, Balloon, Compton effect, Detector, Distribution, Electron, Energetic, Energy, Geomagnetic, Kinetic, Measurement, Micropulsation, Photon, Precipitation, Rocket, Scattering, Source, Spatial, Storm, Temporary, X-ray.

For abstract, see STAR 05 17.
N67-31465 HC$3.00 MF$0.65

AIRCRAFT AND INSTRUMENTATION IN ATMOSPHERIC RESEARCH.
National Center for Atmospheric Research, Boulder, Colo.
For primary bibliographic entry see Field 4B.
PB-175 566 HC$3.00 MF$0.65

4B. Meteorology

GLOBAL TEMPERATURE AND DENSITY PROFILES (1 km to 25 km) FOR MISSILE DESIGN AND PERFORMANCE STUDIES,
Army Missile Command, Redstone Arsenal, Ala.
William W. Vaughan. 15 Nov 59, 19p RS-TM-127-59

Descriptors: (*Climatology, *Weather forecasting), Weather stations, Density, Temperature, Statistical analysis, Data, Atmosphere models, Feasibility studies, Guided missiles.

The report presents a first approximation of the apparent three-sigma monthly extremes, as a function of altitude, for ambient temperature and density on a global basis. The values obtained are based on the climatological temperature and density data for ten observing stations located between 8 and 77 degrees north latitude. The percentage deviations of the three-sigma global temperature and density data from that represented by the ARDC Model Atmosphere, 1956, are also given as a function of altitude. The information presented is intended for application with missile design and performance studies of the Army Ballistic Missile Agency. (Author)
AD-491 108 HC$3.00

REPORT OF THE ARCTIC ICE OBSERVING AND FORECASTING PROGRAM-1965.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 8L.
AD-655 231 MF$0.65

PROPOSAL FOR A 'SMOG TAX',
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 13B.
AD-655 338 HC$3.00 MF$0.65

COMPUTERIZED CLIMATOLOGY VS. SATELLITE RECONNAISSANCE IN A MINIMUM CLOUD AREA,
Rand Corp Santa Monica Calif
C. Schutz. Jul 67, 40p Rept no. RM-5365-PR
Contract F44620-67-C-0045

Descriptors: (*Reconnaissance satellites, Meteorological phenomena), (*Cloud cover, Climatology), Anticyclones, Cyclones, Troposphere, Air mass analysis, Statistical analysis.

Air masses, weather systems, and related flow patterns, along with their seasonal variations, influence cloud cover, and the degradation to satellite surveillance of the earth is thereby affected. A new computer product, developed from representative local observations of clouds, is used to show how these weather variables, even in the semiarid-to-subtropical region of the intermontane states, make 100 percent cloud-free line of sight from a satellite impossible. (Author)
AD-655 347 HC$3.00 MF$0.65

A CLOUD-DROPLET SAMPLER FOR CONTINUOUS OPERATION AT GROUND LEVEL,
Emmanuel Coll Boston Mass Oriental Science Library
Huang Mei-yuan, and Hung Chung-hsiang. Jun 67, 13p Rept no. Emm-67-154
TT-67-62361
Contract AF 19 (628)-5073
Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v35 n2 p257-62 1965.

Descriptors: (*Clouds, Drops), (*Drops, Samplers), (*Meteorological instruments, Drops), Fog, Experimental design, Meteorological parameters.

This paper describes the design and construction of a cloud-droplet sampler for continuous operation at ground level. The equipment used previously can only work continuously for two seconds in a single probing, while in this one the duration of continuous sampling may be extended up to two minutes with an adjustable exposure control. Field experiments carried out in the spring of 1964 show that this instrument can be used to scan the fluctuations of parameters characterizing the microstructure of cloud and fog with periods of the order of 0.1 to 10 seconds. A simple assessment of the instrumental error has also been made. (Author)
AD-655 367 HC$3.00 MF$0.65

MARKOV PROCESS IN THE CONTINUOUS GROWTH OF CLOUD DROPS UNDER CONDITIONS OF SMALL-SCALE FLUCTUATIONS AND ITS EFFECT ON THE DEVELOPMENT OF CUMULONIMBUS,
Emmanuel Coll Boston Mass Oriental Science Library
Hsu Ch'ing-fang, Li Kuei-ch'en, and Wen Ching-sung. Jun 67, 19p Rept no. Emm-67-155
TT-67-62380
Contract AF 19 (628)-5073
Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic), v36 n2 p243-8 1966.

Descriptors: (*Statistical processes, *Cumulonimbus clouds), (*Raindrops, Stochastic processes), Atmospheric condensation, Moisture, Gravity, Diffusion, Cumulus clouds, Probability, Ice, Crystals, Water vapor.

When the scale of fluctuation is relatively small, the continuous stochastic growth of cloud droplets may be treated as a diffusion problem in an R-space where R denotes the drop radius. Not only is the influence of this type of fluctuation very pronounced in warm cumulus, but is also significant in cumulonimbus containing ice crystals. Observational evidence has already shown that during the development of cumulonimbus in middle latitudes, a large number of precipitation elements has already formed in the warm cloud stage often before the onset of crystallization. For such large drops, the average rate of growth is greater by coalescence than by the ice-crystal process. Consequently, the appearance of ice crystals at the later stage and the associated process of sublimation-condensation transfer may not be so important.
AD-655 368 HC$3.00 MF$0.65

AN ADVANCED METEOROLOGICAL SOUNDING SYSTEM, PHASE II (PROOF-OF-CONCEPT),
Motorola Inc Scottsdale Ariz Government Electronics Div
Warren M. Griggs, and J. Kenneth Wood. 15 Sep 66, 77p Rept no. Scientific-2, WS-3022-1
AFCRL-67-0268
Contract AF 19 (628)-4215
See also AD-638 874.

Descriptors: (*Meteorological parameters, *Radiosondes), Meteorological instruments, Sounding rockets, Phase-locked systems, Meteorological balloons, Digital computers, Modulation, Electrical networks, Mechanical properties, Tracking, Design, Telemeter systems.

The report summarizes and reports the results of the Phase II (proof-of-concept) program for the development of an Advanced Meteorological Sounding System. The purpose of Phase II was to establish the feasibility of building an all solid state radiosonde and ground station with ranging capability. The ranging function was performed using a pseudo-noise (PN) code and digital processing techniques. The system test results show that this approach is capable of performing the ranging function within the limits of the design goals. (Author)
AD-655 389 HC$3.00 MF$0.65

RESEARCH ON THE DYNAMICS OF AIR-SEA INTERACTION.
Progress rept.,
Massachusetts Inst of Tech Cambridge Dept of Meteorology
Erik Mollo-Christensen. 10 Jun 67, 36p
Contract Nonr-1841 (74), Grant NSF-GP-4321

Descriptors: (*Marine meteorology, Interactions), Micrometeorology, Air, Oceans, Dynamics, Atmospheric motion, Weather stations, Buoys, Meteorological instruments.

The purpose of the research is to find out more about the dynamics of the small scale processes in air sea interaction.
AD-655 471 HC$3.00 MF$0.65

INVESTIGATION OF THE KINETICS OF CONDENSATION.
Final rept. 1 Jul 66-30 Jun 67,
Berg (T G Owe) Inc Santa Ana Calif
T. G. Owe Berg, Gene E. Carpenter, Joyce E. Clutter, and D. C. George. Jul 67, 23p
ECOM-0080-F
Contract DAAB07-67-C-0080

Descriptors: (*Water vapor, Condensation), (*Condensation, Dynamics), (*Nucleation, Dynamics), Drops, Particles, Ammonium compounds, Chlorides, Cloud chambers, Nitrogen, Nitrogen oxides, Artificial precipitation, Cloud chambers.

Nucleation of condensation in an expansion chamber using NH4Cl particulate has been studied. The NH4Cl particulate was prepared by mixing gaseous NH3 and HCl, both at a concentration of 20ppm in pure (bottled) air. When laboratory air was carefully excluded from the system, the NH4Cl formed no detectable cloud before or after expansion. When a trace of NO, less than 10ppm in N2, was added to the NH4Cl there was no cloud before the expansion but a dense cloud after expansion. It is concluded that the condensation occurs by a chain reaction type mechanism, in which the NO serves as the chain initiator and the NH4Cl particulate serves to stabilize droplets that are too small to be stable alone. The initiator gas in ordinary air remains to be identified. It was found that NO may be removed from air by adsorption in an aerosol filter. (Author)
AD-655 496 HC$3.00 MF$0.65

WIND PROFILE CLIMATOLOGY OF NEW ORLEANS, LOUISIANA,
Army Missile Command Redstone Arsenal Ala Physical Sciences Lab
O. M. Essenwanger, and G. H. R. Reisig. 2 May 67, 53p Rept no. RR-TR-67-8
Research sponsored in part by NASA Order H61485.

Descriptors: (*Louisiana, Climatology), (*Wind, Troposphere), Meteorological parameters, Noise, Statistical data.
Identifiers: New Orleans.

The prominent climatological features of the tropospheric wind field at New Orleans, Louisiana, have been analyzed in terms of wind direction and wind speed. For the purpose of appraising the physical properties of the acoustical far field at the Mississippi Test Facility within the adjacent environment of New Orleans, the directional parameter of the wind field was investigated in particular depth. Besides the mean profiles of wind direction, the mode profiles were derived by means of a new method developed by Dr. Essenwanger, which is presented in an appendix to the report. Both the wind direction profiles, in terms of mean and mode, and the mean scalar wind speed profiles are presented for the whole year, the four seasons, and the individual months. Also, the annual profiles of various time periods of the day are provided for both wind direction and wind speed.
AD-655 582 HC$3.00 MF$0.65

DEVELOPMENT OF AN OCEAN DATA STATION TELEMETERING BUOY.
General Dynamics/Convair San Diego Calif
For primary bibliographic entry see Field 8C.
AD-655 618 HC$3.00 MF$0.65

OBJECTIVE FOG STUDY FOR SIOUX CITY AFS, IOWA,
Weather Squadron (29th) Sioux City Air Force Station Iowa Detachment 4
Charles B. Lambert. 20 Oct 66, 5p

Descriptors: (*Fog, *Weather forecasting), Iowa, Wind, Dew point, Airports, Surface temperatures.

The study uses the surface wind speed and direction and the surface temperature dewpoint spread for 0300Z to forecast the occurrence or nonoccurrence between 0300Z and 1400Z. (Author)
AD-655 811 HC$3.00 MF$0.65

CLIMATOLOGY OF FRANCE. ELEMENTS OF DIURNAL VARIATION.
Climatologie de La France. Elements de La Variation Diurne
France. Direction de La Meteorologie Nationale, Paris.
M. Garnier. Apr 67, 135p REPT.-51
in French

Descriptors: *Cloud cover, *Diurnal variation, *Meteorology, *Table, Atmospheric pressure, Climatology, Cloud, Cover, Diurnal, France, Graph, Humidity, Observation, Temperature, Variation, Velocity, Wind.

For abstract, see STAR 05 17.
N67-30542 HC$3.00 MF$0.65

CHARACTERISTICS OF THE SUBTROPICAL JET STREAM OF THE N.W. OF AFRICA.
Caracteristiques Du Jet Subtropical Sur le N.W. de l'Afrique
France. Direction de La Meteorologie Nationale, Paris.
J. Dettwiller. Apr 67, 32p REPT.-58
in French

Descriptors: *Africa, *Jet airstream, *Meteorology, *Subtropics, Air current, Atmosphere, Climatology, Flight, Jet, Stream, Supersonic, Wind.

For abstract, see STAR 05 17.
N67-30646 HC$3.00 MF$0.65

CONTRIBUTION TO INVESTIGATION OF THE DYNAMIC AXIS OF ROTATION ERRORS OF A CINE- THEODOLITE.
Beitrag Zur Ermittelung Der Dynamischen Drehachsenfehler Eines Kinotheodolits
Deutsche Forschungsanstalt Fur Luft- Und Raumfahrt, Brunswick (West Germany).
H. E. Hoffmann. Dec 65, 105p DLR-FB-65-68
in German, English Summary

Descriptors: *Cinetheodolite, *Instrument error, Accuracy, Arc, Axis, Bending, Dynamics, Effect, Error, Instrument, Measurement, Optics, Rotation, Static, Stiffness.

For abstract, see STAR 05 17.
N67-30696 HC$3.00 MF$0.65

UPPER AIR STATISTICS, AUSTRALIA. TEMPERATURE, HUMIDITY AND GEOPOTENTIAL SURFACE TO 60MB, 0400 GMT, 1953-1956.
Bureau of Meteorology, Melbourne (Australia).
J. V. Maher, and J. N. Mc Rae. Oct 66, 75p

Descriptors: *Australia, *Geopotential, *Humidity, *Statistics, *Temperature measurement, Air, Equipment, Measurement, Month, Radiation, Radiosonde, Surface, Table, Temperature, Upper.

For abstract, see STAR 05 17.
N67-30951 HC$3.00 MF$0.65

A FOURIER TRANSFORM SPECTROMETER FOR THE MEASUREMENT OF ATMOSPHERIC THERMAL RADIATION.
Michigan Univ., Ann Arbor. High Altitude Engineering Lab.
L. W. Chaney, L. T. Loh, and M. T. Surh. May 67, 113p NASA-CR-85892, REPT.-05863-12-T Contract NASR-54/03/

Descriptors: *Atmospheric radiation, *Fourier transform, *Spectrometer, *Thermal radiation, Atmospheric, Balloon, Photography, Radiation, Satellite, Sensitivity, Spectrum, Thermal, Transform.

For abstract, see STAR 05 17.
N67-31484 HC$3.00 MF$0.65

WEATHER IN THE LUQUILLO MOUNTAINS OF PUERTO RICO.
Research paper,
Institute of Tropical Forestry, Rio Piedras, Puerto Rico.
C. B. Briscoe. 1966, 257p RP-ITF-3

Descriptors: (*Puerto Rico, *Climatology), Tropical regions, Mountains, Diurnal variations, Atmospheric temperature, Rainfall, Wind, Humidity, Weather stations, Dew point, Solar radiation, Meteorological parameters, Tables.

Puerto Rico is a mountainous, oceanic island in the American tropics, lying in the path of the northeast trade winds. Although the island is only 110 miles long by 35 wide, vegetation varies from rainforest in the eastern mountains to desert scrub in the southwest. From late 1958 through 1962 the U. S. Army and the Forest Service recorded information on temperature, humidity, wind, light, and rainfall at 13 locations in and near the Luquillo Mountains. Selected aspects of the information collected are summarized. Briefly, the windward coast is more constant as to both temperature and winds than the interior valleys, but least temperature variation is found on the cloud-shrouded peaks. Rainfall is frequent and high in the mountains, although it is insufficient for maximum plant development at fairly frequent intervals during the year. Relative humidity is lowest on the northeastern cape, intermediate in an interior valley, and consistently highest on El Yunque peak. Hourly insolation is approximately equal on the cape and in the interior valley and is higher both places than on the cloudy peak. (Author)
PB-175 564 HC$3.00 MF$0.65

AIRCRAFT AND INSTRUMENTATION IN ATMOSPHERIC RESEARCH.
Technical note.
National Center for Atmospheric Research, Boulder, Colo.
1965, 214p NCAR-TN-6

Descriptors: (*Aircraft, Scientific research), (*Atmosphere, Scientific research), (*Instrumentation, Atmosphere), Sensors, Catalogs, Power supplies, Recording systems, Meteorological instruments, Data processing systems, Performance (Engineering), Meteorological parameters, Measurement, Atmospheric sounding.

This catalog consists of three sections. Section I includes a discussion of trends in instrumentation for atmospheric studies, as reflected in the catalog data. It presents a summary table of aircraft currently used for atmospheric research, with their performance characteristics. It also presents a short list of typical power supply equipments used to energize research sensors, recorders, and data-handling equipment. Section II is a general tabulated survey of research aircraft, and aircraft instrumentation, intended to be as complete as possible for U. S. research facilities. It does not report individual scientific objectives in detail, nor does it give details of instrumentation techniques. Section III is a bibliography of papers and reports which make it possible to study in detail many of the flight research projects and instrumentation techniques which are reported in Section II.
PB-175 566 HC$3.00 MF$0.65

A SYNOPTIC STUDY OF TWO TROPICAL DISTURBANCES IN THE CARIBBEAN.
Technical memo.,
National Hurricane Research Lab., Miami, Fla.
M. A. Lateef, and Clark L. Smith. Apr 67, 39p IERTM-NHRL-78

Descriptors: (*Tropical cyclones, Caribbean Sea), Wind, Atmospheric temperature, Atmospheric motion, Troposphere, Caribbean Sea islands, Meteorological phenomena.

The evolution of the wind and temperature fields during the passage of two tropical disturbances across the Caribbean is described with the aid of twice daily streamline and isotherm analyses at seven levels in the atmosphere as well as pertinent space cross sections. One of the disturbances moved from Puerto Rico across Cuba into the Gulf of Mexico during the period August 3 to 5, 1963, and could be classified as a lower tropospheric steady-state wave in the easterlies. The other disturbance moved westward across the Lesser Antilles and was south of Cuba on August 25, 1962. Subsequently, it moved northward to a position off the east coast of Florida and intensified into Hurricane Alma by 1200 GMT on August 28, 1962. The analyses are based on available data from the existing synoptic station network in the Caribbean and adjoining areas. An attempt is made to relate the upper-tropospheric structures of the two disturbances to developments in the lower levels. (Author)
PB-175 605 HC$3.00 MF$0.65

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

STUDY OF A PLANNING-PROGRAMMING-BUDGETING SYSTEM FOR TRANSPORTATION. VOLUME I. SYNOPSIS.
Planning Research Corp Los Angeles Calif
Apr 67, 45p Rept no. PRC-R-1003-Vol-1
Contract C-204-66
See also AD-655 188 and AD-655 189.

Descriptors: (*Transportation, *Management planning), (*Federal budgets, *Decision making), Urban areas, Safety, Water traffic, Air transportation, Railroads, Money, Costs, Economics.

Volume I synopsizes the PPB system developed and exercised by PRC. An executive summary presents the key products of the PPB for transportation and lists some general conclusions that can be gleaned from PPB's initial application. A project summary presents the PPB system in terms of: (1) its unique contribution to the integration of Federal transportation activities and national transportation objectives, (2) its methodology for analyzing resource allocation alternatives, (3) its technique for determining how transportation programs interact and how they affect nontransportation activities, and (4) its comprehensive ability to present an integrated Federal Transportation Program to the President.
AD-655 187 HC$3.00 MF$0.65

STUDY OF A PLANNING-PROGRAMMING-BUDGETING SYSTEM FOR TRANSPORTATION. VOLUME II. PPB SYSTEM METHODOLOGY.
Planning Research Corp Los Angeles Calif
Apr 67, 169p Rept no. PRC-R-1003-Vol-2
Contract C-204-66
See also AD-655 187 and AD-655 189.

Descriptors: (*Transportation, *Management planning), (*Federal budgets, *Decision making), Numerical analysis, Systems engineering, Costs, Identification, Effectiveness, Money, Management control systems, Economics.

This volume describes the PPB system in much greater detail, discussing the tasks which the analyst must perform to provide transportation management with the information needed to formulate and present an integrated transportation program. A concluding section discusses the problems involved in developing information systems to support PPB.
AD-655 188 HC$3.00 MF$0.65

STUDY OF A PLANNING-PROGRAMMING-BUDGETING SYSTEM FOR TRANSPORTATION. VOLUME III. EXERCISING THE P P B SYSTEM.
Planning Research Corp Los Angeles Calif
Apr 67, 162p Rept no. PRC-R-1003-Vol-3
Contract C-204-66
See also AD-655 187 and AD-655 188.

Descriptors: (*Transportation, *Management planning), (*Federal budgets, *Decision making), Operations research, Systems engineering, Costs, Safety, Economics, Efficiency, Money, Numerical analysis.

This Volume exercises the system described in Volume II and reports on an initial attempt to order and quantify objectives, needs, goals, constraints, program costs, PFP, and their interrelationships. Two of the principal objectives from the list of 19 identified national transportation objectives were quantified in some depth. Treating these two objectives in detail tended to identify problems of importance in validating and extending PPB to the operational level. Significant insights were obtained in the process. A concluding section discusses alternatives to the currently expressed objectives of the national transportation system.
AD-655 189 HC$3.00 MF$0.65

VALUE ENGINEERING.
Handbook.
Assistant Secretary of Defense (Installations and Logistics) Washington D C
29 Mar 63, 63p Rept no. H-111
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402, $0.40 as D7.6/2:111.

Descriptors: (*Value engineering, Handbooks), Cost effectiveness, Management engineering, Organizations, Department of Defense, Government procurement, Training, Motivation, Defense systems.

Experience has demonstrated the effectiveness of Value Engineering in reducing cost without compromising the quality and reliability of defense hardware. This Handbook was developed to aid Government activities and contractors in expanding and accelerating their Value Engineering programs to achieve meaningful cost reductions.
AD-655 294 MF$0.65

PERUVIAN MANAGERS' OPINIONS ON PROBLEMS OF INDUSTRIALIZATION.
Technical rept.,
Kalamazoo Coll Mich
Stillman Bradfield, and Anibal Del Aguila. 1967, 12p Rept no. TR-2
Contract N00014-67-A-0098-0001, ARPA Order-852

Descriptors: (*Industries, Peru), (*Management engineering, Questionnaires), Industrial production, Commerce, Attitudes, Organizations, Money, Industrial relations, Labor, Personnel management.

A brief analysis is given of part of a questionnaire administered to 100 graduates of an executive development program in Lima, Peru. They were employed in many different sectors of the economy, and half were at least part owners of the company where they worked. It focusses on managers' opinions as to the major problems they face on their jobs, and their opinions as to the major obstacles to industrial development in Peru. The most important single on-the-job problem they identified was in the area of finance, followed by production and sales. In general, they did not perceive accounting, industrial relations, administration and organization, or government regulations and controls, as important problem areas in their companies as compared with the first three mentioned. A closer examination of the problems within these areas indicated that they felt that most of them were outside their area of control, and most commonly outside the influence of the company. When asked to give priority rankings to various types of problems facing Peruvian industry in general, two of the most important problems in their judgment were the limited extent of the national market and the amount of competition already in the market. The general orientation of the managers seemed to be characterized by a somewhat fatalistic stance before the limited market, and the various causes of their problems, viewing them as beyond their powers and responsibilities. (Author)
AD-655 295 HC$3.00 MF$0.65

SOME ADVANTAGES AND DISADVANTAGES OF SMALL SCALE INDUSTRY IN A HIGHLY INDUSTRIALIZED ECONOMY.
Technical rept.,
Kalamazoo Coll Mich
Stillman Bradfield, and Anibal Del Aguila. 1967, 9p Rept no. TR-3
Contract N00014-67-A-0098-0001, ARPA Order-852

Descriptors: (*Industries, Management engineering), Industrial relations, Costs, Personnel management, Organizations, Industrial production, Commerce.

The survival of many of the small scale manufacturers in Kalamazoo is explained in terms of the special flexibilities and opportunities they possess which enable them to isolate themselves from the competition of larger producers, and occupy a special niche in the market. Close, personal contact between the owner-manager of a small manufacturing plant and his employees, suppliers and customers enable him to give special attention when required, and also to be able to obtain good technical advice when needed. Inefficiencies resulting from a lack of specialization of personnel are in part compensated for by the costs avoided when the manager fulfills all of these functions himself. (Author)
AD-655 296 HC$3.00 MF$0.65

DOD USER-NEEDS STUDY. PHASE II. SCIENTIFIC AND TECHNICAL INFORMATION IN THE DEFENSE INDUSTRY: INTERVIEW GUIDE HANDBOOK.
North American Aviation Inc Downey Calif Space and Information Systems Div
For primary bibliographic entry see Field 5B.
AD-655 297 HC$3.00 MF$0.65

FOREIGN SCIENCE BULLETIN, VOL. 3, NO. 6, 1967.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 20E.
AD-655 339 HC$3.00 MF$0.65

A STOCHASTIC DYNAMIC MULTIMODE TRANSPORTATION MODEL,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 12B.
AD-655 344 HC$3.00 MF$0.65

ABILITY, VALUES AND CONCEPTS OF EQUITABLE SALARY INCREASES.
Technical rept.,
Pittsburgh Univ Pa Management Research Center
Bernard M. Bass. 15 Jul 67, 19p Rept no. TR-14
Contract Nonr-624 (14)

Descriptors: (*Personnel management, Decision making), Industrial psychology, Group dynamics, Social psychology, Industrial relations, Management engineering, Motivation, Wages.

113 American graduate business students recommended annual salary increases for 10 fictitious engineers, each with a different reason for being given a raise. The mean recommendation was 9.3 percent. Recommenders were more generous if they were of lower intelligence and achievement, were not engineers themselves, and if they held strong social and service rather than theoretical and economic values. They also were more willing to spend company money for other social and personnel purposes. (Author)
AD-655 428 HC$3.00 MF$0.65

HOW TO SUCCEED IN BUSINESS ACCORDING TO BUSINESS STUDENTS AND MANAGERS.
Technical rept.,
Pittsburgh Univ Pa Management Research Center
Bernard M. Bass. 15 Jul 67, 26p Rept no. TR-15
Contract Nonr-624 (14)

Descriptors: (*Personnel management, Decision making), Industrial psychology, Group dynamics, Social psychology, Attitudes, Industrial relations, Management engineering, Motivation, Questionnaires, Organizations, Factor analysis.

The Organizational Success Questionnaire was developed to see the extent graduate business students and middle managers accept the opinions of the social theorists and the political theorists about what it takes to succeed in large organizations. Six factors emerged in a first analysis but failed to remain sufficiently independent. Consequently, a social approach scale was constructed with a mean internal consistency reliability of .72 and a mean retest reliability of .52. A political scale yielded similar reliabilities. Slight, but meaningful relations were found between scale responses and responses to other inventories of orientation and value. Both social and political approaches are needed for success, fairly or very often, according to the respondents (the social somewhat more than the political.) But initially students favored less activity of either kind compared to middle managers. Following training the managers remained unchanged but the students became more like the managers. (Author)
AD-655 429 HC$3.00 MF$0.65

AUTOMATED DATA PROCESSING AND CONTROL SYSTEM FOR TEST EQUIPMENT.
Technical rept.,
Naval Avionics Facility Indianapolis Ind
Robert Stibs. Apr 65, 82p Rept no. NAFI-TR-500

Descriptors: (*Decision making, Management engineering), (*Test equipment, *Inventory control), (*Data processing systems, *Programming (Computers)), Calibration, Budgets, Scheduling, Maintenance, Automation, Documentation, Control

systems, Punched cards, Magnetic tape, Data storage systems, Feedback, Input-output devices.

The report provides a detailed documentation of an automated control system and data processing procedure developed and established for NAFI's test equipment calibration program to provide: (1) Inventory control. (2) Periodic recall for scheduled calibration. (3) Unscheduled calibrations and/or repairs. (4) Progress reporting of calibration and repair actions. (5) Special analyses such as for adjustment of calibration cycles based on feedback of calibration and repair data into the 'preventive maintenance' recall system.
AD-655 469 HC$3.00 MF$0.65

R AND D ABSTRACTS. VOLUME 20 NUMBER 9, 1-15 MAY 1967.
Ministry of Technology London (England) Technical Information and Library Services
For primary bibliographic entry see Field 5B.
AD-655 485 HC$3.00 MF$0.65

LABOR AND MACHINE LIMITED PRODUCTION SYSTEMS.
Revised ed.,
California Univ Los Angeles Western Management Science Inst
Rosser T. Nelson. Aug 66, 28p Rept no. Reprint-42
Research supported in part by Ford Foundation.
Availability: Published in Management Science v13 n9 p648-71 May 1967.

Descriptors: (*Queueing theory, *Management engineering), (*Labor, Machines), Employment, Training, Efficiency, Production, Industrial equipment, Probability density functions, Effectiveness.

A number of investigations have been performed with models of machine limited production systems. In the main, the work has centered upon evaluation of alternative queue disciplines. In this paper, a model is proposed for studying systems in which both machines and labor are limiting resources. The proposed model includes several design and control factors which offer promising subjects for research. These factors relate to labor and job assignment procedures and control, labor force training, and system flexibility as determined by equipment purchasing and employment policies. Results are reported for an initial set of experiments in which the labor assignment procedure and the size of the labor force are variables, and for two subsequent sets of experiments in which the labor assignment procedure, the degree of centralized control of labor assignment, the job routing characteristics of the network, and the labor efficiency matrix are variables. Suggestions are given for further research.
AD-655 543 Not available from CFSTI.

SOME CONSTRAINTS ON SHIPPING IN LINEAR PROGRAMMING MODELS,
Research Analysis Corp Mclean Va
For primary bibliographic entry see Field 15E.
AD-655 601 Not available from CFSTI.

INVENTORY CONTROL OF A MULTIPRODUCT SYSTEM WITH A LIMITED PRODUCTION RESOURCE,
California Univ Los Angeles Western Management Science Inst
For primary bibliographic entry see Field 12B.
AD-655 612 Not available from CFSTI.

MAXIMIZING STATIONARY UTILITY IN A CONSTANT TECHNOLOGY,
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
For primary bibliographic entry see Field 12B.
AD-655 627 HC$3.00 MF$0.65

AN EXAMINATION OF THE BLAU-SCOTT AND ETZIONI TYPOLOGIES,
Ohio State Univ Columbus Behavioral Sciences Lab
Richard H. Hall, J. Eugene Haas, and Norman J. Johnson. Aug 67, 25p
AFOSR-67-1696
Contract AF 49 (638)-447
Availability: Published in Administrative Science Quarterly v12 n1 p118-39 Jun 1967.

Descriptors: (*Organizations, *Management engineering), Environment, Classification, Power, Classification, Military personnel, Civilian personnel, Selection, Statistical tests.

Data from 75 organizations are used in the analysis of the utility of the two typologies in differentiating between organizations on a series of variables. The findings indicate that the typologies are related to each other and, to a lesser degree, to indicators of goal specificity, power structure, relationships between internal segments, and relations with the external environment. Weaker relationships are found between the typologies and indicators of complexity, formalization, major activities, and changes in activities and emphases. It is suggested that future typological efforts build upon each other and upon any empirical relationships from them.
AD-655 728 Not available from CFSTI.

TOTAL PACKAGE PROCUREMENT CONCEPT, SYNTHESIS OF FINDINGS.
Logistics Management Inst Washington D C
Jun 67, 122p
Contract SD-271

Descriptors: (*Government procurement, Contracts), Management planning, Logistics, Department of Defense, Industries, Manpower, Costs, Management control systems.

The Total Package method of procurement offers significant advantages over development-only type contracts for both the Government and industry. Advantages include cost savings, shorter development schedules, design for producibility, long range planning, and from the Government's point of view, increased competition. Disadvantages include greater financial risk, premature program definition, and severe competition and increased proposal expenses from the contractor's point of view. TPP should be applied to operational systems development programs and to smaller programs below the DoD Directive 3200.9 threshold criteria. TPP should not be applied to systems where the technology is rapidly changing and responsive to changing military needs or to systems which require an interface application. There is a greater need for an integrated management information system for TPP programs than there is for development-only programs. The Government should disengage from the contractor in TPP programs, and retain visibility but not control unless program redirection is necessary. On balance, the influential factors of cost, schedule, and system performance in the TPP programs studied tend to support rather than constrain technical innovation. (Author)
AD-655 814 HC$3.00 MF$0.65

MULTI-YEAR PROCUREMENT AT THE SUBCONTRACTOR LEVEL.
Logistics Management Inst Washington D C
Jun 67, 38p
Contract SD-271

Descriptors: (*Government procurement, Contracts), Management planning, Logistics, Department of Defense, Industries, Manpower, Costs, Management control systems.

The increasing use of multi-year and total package procurement has given rise to the possibility of achieving greater economies by the use of multi-year subcontracts. In addition, prime contracts placed on an annual funding basis, and sole source prime contracts may provide opportunities for price reductions through multi-year subcontracting. The purpose of this task is to (1) investigate industry policies and practices in using multi-year procurement techniques at the subcontract level; (2) identify and analyze DoD policy, fiscal, and contractual impediments, if any, to the use of multi-year subcontracts for both multi-year and non-multi-year prime contracts; (3) identify and analyze any extraordinary risks to both the Government and contractors inherent in multi-year subcontracting; (4) develop criteria for selection and conduct of procurements to test the practicability, and to determine the benefits to the Government of multi-year subcontracting. (Author)
AD-655 815 HC$3.00 MF$0.65

THE CHANNELS OF TECHNOLOGY ACQUISITION IN COMMERCIAL FIRMS, AND THE NASA DISSEMINATION PROGRAM.
Denver Research Inst., Colo.
C. V. Bickert, T. D. Browne, D. C. Coddington, J. S. Gilmore, and W. S. Gould. Jun 67, 146p
NASA-CR-790
Contract NSR-06-004-039

Descriptors: *Data acquisition, *Industry, *Nasa program, *Technology, Acquisition, Administration, Aeronautics, Control, Data, Development, Education, Electronics, Engineering, Equipment, Information, Machine, Manufacturing, Medical, Nation, Personnel, Processing, Program, Reproduction, Research, Space, Training, Transfer, University.

For abstract, see STAR 05 17.
N67-31477 HC$3.00 MF$0.65

NASA - THE SCIENTIFIC IMAGE.
California Univ., Berkeley. Space Sciences Lab.
L. V. Blankenship. Apr 67, 88p NASA-CR-85799
Grant NSG-243
Its Paper No. 65

Descriptors: *Decision making, *Nasa program, Astronomy, Atmosphere, Chemistry, Decision, Earth, Genetics, Image, Mathematics, Microbiology, Physiology, Question, Research, Science, Scientist, Space.

For abstract, see STAR 05 17.
N67-31488 HC$3.00 MF$0.65

METAL-WORKING INDUSTRY TRAINING MANUAL.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
For primary bibliographic entry see Field 5I.
PB-175 521 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A BRASS FOUNDRY.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 524 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF MINERAL WOOL.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 525 HC$3.00 MF$0.65

PRODUCTION MANAGEMENT METHODS IN A SMALL SHOP.
Agency for International Development, Washington, D. C. Communications Resources Div.

1957, 62p Technical Bull-68
Prepared in cooperation with Small Business Administration, Washington, D. C.

Descriptors: (*Management engineering, *Commerce), Management planning, Costs, Budgets, Instruction manuals, Industrial production, Industrial plants, Periodicals, Inventory control, Management control systems.

Contents: Long term planning; Small shop advertising; Development of new products; Cost accounting and cost distribution; Budget control; Production planning and preparation of work; Small business administration publications.
PB-175 528 HC$3.00 MF$0.65

STARTING AND OPERATING 15 DIFFERENT SERVICE INDUSTRIES.
Agency for International Development, Washington, D. C. Communications Resources Div.
Jun 60, 117p
Prepared in cooperation with New York State Dept. of Commerce.

Descriptors: (*Management engineering, *Commerce), Management planning, Costs, Budgets, Instruction manuals, Industrial production, Industrial plants, Inventory control, Periodicals, Management control systems.

Contents: Beauty shop; Construction contracting; Diaper laundry; Dry cleaning; Eating establishments; Employment agency; Export trade; Gasoline service station; Hand laundry; Motor court and motel; Motor trucking; Nursing homes; Radio and television service shop; Selling by mail; Vending machine route.
PB-175 530 HC$3.00 MF$0.65

SMALL BRASS FOUNDRY.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 532 HC$3.00 MF$0.65

EXECUTIVE'S ROLE IN AN ORGANIZATION.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
1957, 82p Training Manual-110
Prepared in cooperation with Industrial Development Center, Manila. Management Training Forum Services.

Descriptors: (*Management engineering, *Supervisory personnel), Organizations, Management planning, Management control systems, Leadership, Job analysis, Instruction manuals.

Contents: Responsibilities of the executive; Company organization; Departmental organization; Planning; Directing; Coordinating; Controlling.
PB-175 535 HC$3.00 MF$0.65

EXPERIENCE OF PRIVATE ENTERPRISE IN MANUFACTURING DEVELOPMENT IN UNDERDEVELOPED AREAS,
Columbia Univ., New York. Bureau of Applied Social Research.
For primary bibliographic entry see Field 5C.
PB-175 536 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF NYLON HOSIERY.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 538 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF COTTON DRESSES.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 539 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A JOB MACHINE SHOP.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 541 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A WOOL SCOURING PLANT.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 543 HC$3.00 MF$0.65

HAND-MADE BLOWN GLASS AND FINE CAST CRYSTAL.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
For primary bibliographic entry see Field 5C.
PB-175 549 HC$3.00 MF$0.65

HUMAN RELATIONS IN MANAGEMENT.
Management primer.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
1962, 68p Training manual-93
Report on Principles and Practices of Productivity.

Descriptors: (*Management engineering, *Instruction manuals), Training devices, Production control, Wages, Personnel management, Labor, Supervision, Money, Public relations, Psychology, Employee relations.

Contents: Human relations and organization; Improving human relations; Dealing with representatives of employee groups; Principles of supervision; Human relations and productivity. (Author)
PB-175 551 HC$3.00 MF$0.65

5B. Documentation and Information Technology

FACTOR FILE CONVERSION,
National Resource Evaluation Center, Washington, D. C.
For primary bibliographic entry see Field 9B.
AD-447 860 HC$3.00

A REVIEW OF SELECTED METHODS OF MACHINE MANIPULATION OF CHEMICAL STRUCTURES,
General Electric Co., Huntsville, Ala. Computer Dept.
J. Burger, and W. J. Wilson. 1 Sep 64, 65p
RSIC-287
Contract DA-01-021-AMC-242 (Z)

Descriptors: (*Data processing systems, Chemical compounds), (*Chemical compounds, Information retrieval), (*Information retrieval, Chemical compounds), (*Data storage systems, Chemical compounds), Computers, Molecular structure, Scientific organizations, Reviews.
Identifiers: Cids, Chemical notation systems.

Selected methods for machine manipulation of chemical structure formulae are discussed and reviewed in light of possible application to the U. S. Army Chemical Information Data System. The respective techniques and computer algorithms developed for input data preparation, structure partitioning, generic screening, canonical ordering, file organization, identity searches, and substructure searching based on linear notations and topological representations of the chemical structure diagram or graphs are, in general, the subjects discussed for the selected chemical reference and information retrieval systems being developed at interviewed companies for CDC, Burroughs, and IBMcomputer equipment. (Author)
AD-451 700 HC$3.00

JOINT MILITARY-INDUSTRY GUIDED MISSILE RELIABILITY SYMPOSIUM (6th), VOLUME I, 15-17 FEB 1960.
Army Missile Command, Redstone Arsenal, Ala.
For primary bibliographic entry see Field 16D.
AD-454 674 HC$3.00

A COLLECTION OF ALGORITHMS FOR SEARCHING CHEMICAL COMPOUND STRUCTURE ANALOGS,
General Electric Co., Huntsville, Ala. Computer Dept.
William J. Wilson, and John B. Burger. 30 Nov 64, 29p
OCRD-DATI-CIDS-3
Contract DA-01-021-AMC-242 (Z)

Descriptors: (*Chemical compounds, Information retrieval), (*Information retrieval, Molecular structure), Algorithms, Documentation, Computer logic, Programming languages, Graphics, Computer programs, Symbols.
Identifiers: Chemical notation systems, CIDS project.

Some of the requirements of a computer system for searching chemical compound structure analogs are reviewed and algorithms are offered where appropriate. Among the factors discussed are file organization and data elements, the use of screens, the question of maximum query volume of a single pass of a master file, and the question of canonical ordering of finite undirected graphs to permit the determination of isomorphism between graphs. (Author)
AD-460 819 HC$3.00

HIGH SPEED DISPLAY OF CHEMICAL NOMENCLATURE, MOLECULAR FORMULA AND STRUCTURAL DIAGRAM,
General Electric Co., Huntsville, Ala. Computer Dept.
John B. Burger. 31 Dec 64, 27p
OCRD-DATI-CIDS-4
Contract DA-01-021-AMC-242 (Z)

Descriptors: (*Chemical compounds, Information retrieval), (*Information retrieval, Molecular structure), (*Molecular structure, *Display systems), Documentation, Programming (Computers), Optimization, Symbols.
Identifiers: Chemical notation systems, CIDS project.

Recent improvements in the resolution of a proprietary cathode ray tube and the application of locally-developed software techniques resulted in the use of the SC-4020 for the production of high quality and high-density character sets and symbols through the simulation of the typing mode with the vector mode of operation. (Author)
AD-460 820 HC$3.00

A BIBLIOGRAPHY OF SEISMOLOGY FOR THE VELA UNIFORM PROGRAM.
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
For primary bibliographic entry see Field 8K.
AD-469 253 HC$3.00 MF$0.65

DOD USER-NEEDS STUDY. PHASE II. SCIENTIFIC AND TECHNICAL INFORMATION IN THE DEFENSE INDUSTRY: INTERVIEW GUIDE HANDBOOK.

North American Aviation Inc Downey Calif Space and Information Systems Div

1 Aug 65, 121p Rept no. SID-65-1041-1
Contract DSA7-16244
See also AD-647 111, AD-647 112 and AD-649 284.

Descriptors: (* Department of Defense, Documentation), (* Information retrieval, Department of Defense), (* Engineering personnel, Information retrieval), (* Job analysis, Engineering personnel), Flow charting, Decision making, Handbooks, Scientific research, Documentation, Training.

This handbook is a description of the interviewing technique and tools used in the DOD User-Needs Study to determine how scientific and technical information is acquired and used by scientific and engineering personnel in the defense industry. It contains an explanation of and instruction in the interviewing method, the questions to be covered, and the various interviewer aids available. Copies of the Interview Guide, the Interview Reference Manual, and a Synopsis of Interview Topics sent to each respondent are included. In addition, there is a section indicating the participating defense industry companies and one which presents a glossary of terms.
AD-655 297 HC$3.00 MF$0.65

REVIEW OF 'THE EMERGENCE OF PAKISTAN',
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5D.
AD-655 343 HC$3.00 MF$0.65

EXPERIMENTAL SETUP FOR THE SYNTHESIS OF SPEECH SEGMENTS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 17B.
AD-655 346 HC$3.00 MF$0.65

TECHNICAL CYBERNETICS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 9D.
AD-655 365 HC$3.00 MF$0.65

AUTOMATED DATA PROCESSING AND CONTROL SYSTEM FOR TEST EQUIPMENT.
Naval Avionics Facility Indianapolis Ind
For primary bibliographic entry see Field 5A.
AD-655 469 HC$3.00 MF$0.65

R AND D ABSTRACTS. VOLUME 20 NUMBER 9, 1-15 MAY 1967.
Ministry of Technology London (England) Technical Information and Library Services
15 May 67, 82p
See also AD-654 501.

Descriptors: (* Scientific research, Abstracts), Great Britain.

The reports are catalogued in TIL by author, originator, report number, title, subject (Universal Decimal Classification) and contract and project numbers.
AD-655 485 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION BASIC STUDY, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 510 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION PATIENT ACCOUNTING ANNEX A, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 511 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL REGULATING ANNEX B, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 512 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL SUPPLY ANNEX C, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 513 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL INTELLIGENCE ANNEX D, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 514 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL REPORTING ANNEX E, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 515 HC$3.00 MF$0.65

TECHNICAL AND MEDICAL RESEARCH LIBRARIES AND INFORMATION CENTERS OF THE DEPARTMENT OF THE ARMY.
Revised ed.,
Army Natick Labs Mass
Robert L. Martin. Sep 66, 20p
ATLIS-1
Revision of manuscript submitted Jan 66.

Descriptors: (* Technical information centers, * Medical research), (* Libraries, Medical research), Army research.

The document provides a listing of technical libraries and information systems of the Department of the Army. These include libraries and information centers serving Army scientific, engineering, and medical research installations, as well as comparable facilities under Army management or contract. Selection was made for the most part with reference to the technical and scientific mission of the organization, with technical nature of the library holdings being of secondary consideration. In this context, a number of Army school, hospital medical, and Special Services libraries do not fall within the restricted scope of the directory and are omitted. A few exceptions are noted, however, because of significant size and depth of the library holdings in technical subjects. The listings are arranged alphabetically by state. Included in the units of information are the name of the organization with mailing address, librarian director, telephone number, and size of the staff and collections as far as this information is available.
AD-655 535 HC$3.00 MF$0.65

THE RAYLEIGH ARCHIVES DEDICATION.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 5D.
AD-655 773 HC$3.00 MF$0.65

BIOMEDICAL APPLICATIONS OF NASA SCIENCE AND TECHNOLOGY FINAL REPORT, 15 JUN. 1966 - 14 JUN. 1967.
Research Triangle Inst., Durham, N. C. Solid State Lab.
For primary bibliographic entry see Field 6L.
For abstract, see STAR 05 17.
N67-31399 HC$3.00 MF$0.65

THE CHANNELS OF TECHNOLOGY ACQUISITION IN COMMERCIAL FIRMS, AND THE NASA DISSEMINATION PROGRAM.
Denver Research Inst., Colo.
For primary bibliographic entry see Field 5A.
For abstract, see STAR 05 17.
N67-31477 HC$3.00 MF$0.65

HUMAN RELATIONS IN MANAGEMENT.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5A.
PB-175 551 HC$3.00 MF$0.65

LINKING RESEARCH AND TEACHING. DESCRIPTION OF A LABORATORY COURSE RESULTING FROM A RESEARCH PROJECT AT A LIBRARY SCHOOL.
Technical rept.,
Western Reserve Univ., Cleveland, Ohio. Comparative Systems Lab.
Tefko Saracevic. May 67, 30p CSL-TR-10
Grant PHS-FR-00118

Descriptors: (* Information retrieval, * Education), Effectiveness, Scientific research, Documentation, Tests, Libraries.

A description of a course, LS574, entitled 'Information Retrieval Systems Laboratory' is presented. The paper describes the following: background and motivation for the course; LS574--the approach, purpose, methodology, content and design; LS574 in practice--conduct, students, problems encountered and a short attempt to evaluation from the instructor's point of view; and finally the research project which served as the basis for development of the course. An attempt is made to present the discussion, the problems, the techniques, the questions asked and their solutions, in a general manner so that general implications can be drawn for the important question of linking research and teaching.
PB-175 560 HC$3.00 MF$0.65

TEXTUAL CORRELATES OF RELEVANCE: PRELIMINARY INVESTIGATIONS.
Technical rept.,
Western Reserve Univ., Cleveland, Ohio. Comparative Systems Lab.
Carolyn G. Zull, and George J. Baumanis. Jun 67, 48p CSL-TR-9
Grant PHS-FR-00118-03

Descriptors: (* Information retrieval, Effectiveness), Subject indexing, Search theory, Documentation.

Identifiers: Relevance (Documentation).

A study of relevance through comparison of texts judged by users is reported. The relevant set of documents for each information request was characterized by textual properties. The validity of procedures and interpretations is discussed. Consideration is given to possible mechanization of the process and its possible usefulness in development of iterative searching procedures, in building profiles of user needs, and in improving aspects of information retrieval such as question analysis, indexing, thesaurus building, and system evaluation. (Author)
PB-175 561 HC$3.00 MF$0.65

PROCEDURE MANUALS FOR THE COMPARATIVE SYSTEMS LABORATORY EXPERIMENTS.
Technical rept.,
Western Reserve Univ., Cleveland, Ohio. Comparative Systems Lab.
Tefko Saracevic, and Leslie Rothenberg. Mar 67, 217p CSL-TR-8
Grant PHS-FR-00118

Descriptors: (* Information retrieval, Instruction manuals), Subject indexing, Vocabulary, Documentation, Experimental design, Effectiveness.

The report deals with experiments in testing and evaluation of an information retrieval system within the Comparative Systems Laboratory (CSL). The twelve sections of the report reflect the developmental phase of CSL. Section I outlines the approach and the general methodology developed in CSL, the operational design of the experiments, the construction and use of the manuals, and the general significance of the manuals. Sections II through XI present the operational manuals for indexing, encoding, question analysis, search strategy, dissemination, and instructions to users. Section XII lists andc describes the special computer programs written for CSL. The primary purpose of the manuals was to serve as operational work guides for the CSL staff in constructing the components of the retrieval system to be tested in such a manner which permitted testing by a system approach, and to prescribe the procedures for comparative testing. The manuals also served as training aids. (Author)
PB-175 562 HC$3.00 MF$0.65

CZECHOSLOVAK BIO-MEDICAL SERIALS: THEIR IDENTIFICATION AND AN ANALYSIS OF THEIR CONTENTS,
George Washington Univ., Washington, D. C. Biological Sciences Communication Project.
For primary bibliographic entry see Field 6E.
PB-175 606 HC$3.00 MF$0.65

THE COPYRIGHT LAW AS IT RELATES TO NATIONAL INFORMATION SYSTEMS AND NATIONAL PROGRAMS: A STUDY BY THE AD HOC TASK GROUP ON LEGAL ASPECTS INVOLVED IN NATIONAL INFORMATION SYSTEMS.
Federal Council for Science and Technology, Washington, D. C. Committee on Scientific and Technical Information.
Jul 67, 82p

Descriptors: (* Documentation, * Law), (* Data processing systems, Law), Computers, United States Government, Reports, Scientific research, Data storage systems, Technical information centers, Abstracts, Libraries.
Identifiers: Information systems, Copyright laws.

The report analyzes the problems of copyright protection in relation to the development of national information networks, particularly from the standpoint of the scientific and technical information activities of the Federal Government. It is intended to serve as a background discussion paper to assist the formulation of public policies in this important area. Some problem areas considered are (1) the problem of ready access to copyrighted material; (2) the problem of making computer 'input' an infringement; (3) the problem of exemptions for nonprofit uses.
PB-175 618 HC$3.00 MF$0.65

5C. Economics

ELECTRIC POWER DEVELOPMENT IN MAINLAND CHINA: PREWAR AND POSTWAR,
RAND Corp., Santa Monica, Calif.
K. C. Yeh. 27 Nov 56, 119p RM-1821
Contract AF 33 (038)-6413

Descriptors: (* Electric power production, * China), Electrical industry, Industrial production, Power supplies, Statistical data, Tables, Distribution (Economics), Consumption, Economics.

The purpose of this paper is to outline the major trends in the growth of the electric power industry in Mainland China and to examine some of the problems in the course of its development. The study covers the period 1932-55, but the main attention is given to the years 1932-36 and 1949-55.
AD-123 534 HC$3.00

SOVIET AGRICULTURAL MARKETINGS AND PRICES, 1928-1954.
Research memo.,
RAND Corp., Santa Monica, Calif.
Jerzy F. Karcz. 2 Jul 57, 506p RM-1930

Descriptors: (* Economics, USSR), (* Agriculture, * USSR), Commerce, Distribution (Economics), Consumption, Costs, Population, Money.

The main purpose of this study is to present index numbers of Soviet agricultural prices for selected years in the period 1928-1954. Over most of this period, an agricultural commodity was likely to be procured by the central government or local agencies at two or more controlled prices, and sold on the free market at still another price. In order to obtain an average realized farm price, the value of all marketings (including payments in kind valued at Soviet accounting prices) is divided by the total quantity marketed. Alternative index numbers are also computed for the average prices actually received by peasant producers (excluding accounting prices). For the period 1928-1937, the data on agricultural marketings and prices are relatively abundant. During this period, average realized farm prices increased about six-fold. For the period 1937-1954, the available data are much more scanty; what information there is suggests that average realized farm prices increased during this period by two and one-half times. A comparison is made of prices received by the farmer or peasant with the prices he must pay for retail goods and services. In 1937, it appears that the peasant's terms of trade were only 70 or 80 per cent as favorable as in 1928; however, from 1937 to 1954, it appears that his terms of trade improved by about 40 per cent. This comparison suggests that relative to the city worker, the peasant is as well off now as he was in 1928. (Author)
AD-133 013 HC$3.00

A SELECTED BIBLIOGRAPHY ON ECONOMIC DEVELOPMENT AND FOREIGN AID.
Revised ed.,
RAND Corp., Santa Monica, Calif.
Marjorie Hald. 26 Nov 58, 99p RM-2096-1
Revision of manuscript submitted 22 Oct 57.

Descriptors: (* Foreign aid, Bibliographies), (* Economics, Bibliographies), Political science, Sociology, United States, Foreign policy, Commerce.

A selective bibliography is presented on economic and other aspects of growth and development in underdeveloped areas and on the policies of the United States and other agencies in fostering development. The emphasis is on the word 'selective' since, although the bibliography contains over 1500 items, it is in no sense an exhaustive listing of the materials. There are a number of non-economic factors which are of prime significance in development; consequently some items on political and sociological problems have been included. Primary emphasis is given to the period from 1950 through 1957, with the greater emphasis on the last five years.
AD-206 551 HC$3.00

GOVERNMENT ACQUISITION OF AGRICULTURAL OUTPUT IN MAINLAND CHINA, 1953-56.
Research memo.,
RAND Corp., Santa Monica, Calif.
Ronald Hsia. 3 Sep 58, 98p RM-2207

Descriptors: (* Economics, China), (* Agriculture, * China), Government (Foreign), Commerce, Distribution (Economics), Government procurement, Money, Population, Costs, Consumption.

Government acquisitions of agricultural products in Mainland China during 1953-1956 are estimated from data on tax collections and government purchases. After allowing for relief payments in kind and government sales to the agricultural sector, net government acquisitions are found to rise from 9.6 billion yuan in 1953, to 12.4 billion yuan in 1955. They decline to 10.4 billion yuan in 1956. (Author)
AD-211 940 HC$3.00

ECONOMIC PROSPECTS FOR COMMUNIST CHINA,
RAND Corp., Santa Monica, Calif.
Richard Moorsteen. 10 Nov 58, 59p P-1298

Descriptors: (* Economics, * China), Communism, Industrial production, Consumption, Distribution (Economics), Natural resources, Labor, Costs.

It is concluded that there is almost no aspect of China's future economic development about which one can speak with certainty. The effort in this report is to draw attention to the gravest of the problems in the path of China's further industrialization, and to suggest the directions in which solutions are most likely to be sought.
AD-224 042 HC$3.00

SOVIET STATE PLANNING AND FORCED INDUSTRIALIZATION AS A MODEL FOR ASIA,
RAND Corp., Santa Monica, Calif.
Oleg Hoeffding. 4 Aug 58, 31p P-1450

Descriptors: (* Economics, * USSR), Industries, Natural resources, Distribution (Economics), Consumption, Statistical data, Industrial production, Agriculture, Population.

It is suggested that Soviet Russian planning and industrialization experience has few lessons to offer to countries striving to bring about economic development in the Asian demographic setting.
AD-224 061 HC$3.00

TERMS OF TRADE BETWEEN THE SOVIET UNION AND SMALLER COMMUNIST COUNTRIES, 1955 TO 1957,
RAND Corp., Santa Monica, Calif.
Horst Mendershausen. 18 Jan 59, 58p P-1598

Descriptors: (* Commerce, USSR), (* Economics, USSR), Foreign policy, Costs, Distribution (Economics), Money, Bargaining, Statistical data, Tables.

The issues examined in the report are as follows: Is there evidence of Soviet price differentiation

at the expense of the Satellites (a) in the case of Soviet exports, (b) in the case of Soviet imports, (c) in all or some commodities, (d) using as standards the prices charged in Soviet foreign trade with Western countries, or (e) using foreign trade unit values of Western countries as standards. Has price discrimination (if it existed) diminished over time, particularly during the period of unrest after 1953; has it disappeared, perhaps given way to price discrimination in favor of the Satellites.
AD-224 139 HC$3.00

THE FINANCING OF PUBLIC INVESTMENT IN COMMUNIST CHINA,
RAND Corp., Santa Monica, Calif.
Feng-hwa Mah. 30 Jun 60, 54p P-2031-RC
Prepared in cooperation with California Univ., Berkeley.

Descriptors: (*Economics, *China), Communism, Banking, Money, Government (Foreign), Budgets, Commerce, Distribution (Economics), Industries, Tables, Population.

A study was made of the sources of funds for fixed capital investment made by the Chinese Communist government. Since in Communist China the government has essentially taken over the investment function of the whole economy, state capital investment practically approximates the fixed capital investment of the entire economy. What have been left out are capital investment made by private industry and commerce, and private investment in housing, both are believed to be negligible; and the investment in fixed assets by the peasants, which is estimated to be about 7,200 million yuan from 1953 to 1957. Net changes in working capital are not considered in the discussion because it is believed the expansion of fixed capital is a better indicator of the real efforts made toward economic growth. The inquiry is confined to the period of the first Five Year Plan, 1953-1957.
AD-224 292 HC$3.00

DEPENDENCE OF EAST GERMANY ON WESTERN IMPORTS.
Research memo.,
RAND Corp., Santa Monica, Calif.
Horst Mendershausen. 17 Jul 59, 54p RM-2414

Descriptors: (*Economics, *East Germany), (*Commerce, East Germany), Foreign policy, Machines, Chemicals, Metals, Statistical data, Political science.

Contents: East German import structure; Essentiality of imports from Western Europe; Significance of chemical imports; Machinery industry and imports; Services and Berlin traffic. Soviet-East German trade in the statistics of the two countries.
AD-312 113 HC$3.00

AN ECONOMIC ANALYSIS OF US NAVAL SHIPBUILDING COSTS,
Institute for Defense Analyses Arlington Va Economic and Political Studies Div
For primary bibliographic entry see Field 13J.
AD-655 233 HC$3.00 MF$0.65

PERUVIAN MANAGERS' OPINIONS ON PROBLEMS OF INDUSTRIALIZATION.
Kalamazoo Coll Mich
For primary bibliographic entry see Field 5A.
AD-655 295 HC$3.00 MF$0.65

SOME ADVANTAGES AND DISADVANTAGES OF SMALL SCALE INDUSTRY IN A HIGHLY INDUSTRIALIZED ECONOMY.
Kalamazoo Coll Mich
For primary bibliographic entry see Field 5A.
AD-655 296 HC$3.00 MF$0.65

OPTIMAL INVESTMENT POLICY: AN EXAMPLE OF A CONTROL PROBLEM IN ECONOMIC THEORY.
Technical rept.,
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
A. R. Dobell, and Y. C. Ho. 14 Oct 66, 16p Rept no. TR-532
Contract Nonr-1866 (16)
Revision of manuscript submitted 22 Apr 66.
Availability: Published in IEEE Transactions on Automatic Control vAC-12 n1 p4-14 Feb 1967.

Descriptors: (*Economics, Optimization), (*Control systems, Theory), Dynamic programming, Boundary value problems, Labor, Training, Costs, Employment, Production, Money, Problem solving, Convex sets, Inequalities, Hamiltonian, Sequences, Differential equations.

A problem in mathematical economics concerning the optimal investment of resources is solved via the techniques of optimal control theory. Interesting theoretical complications include the simultaneous presence of interdependent control variable inequality constraints, state variable inequality constraints, and singularity conditions. Economic implications of the results are briefly discussed. (Author)
AD-655 563 Not available from CFSTI.

SST AN ECONOMIC ANALYSIS. PART I. EXECUTIVE SUMMARY,
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 603 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART I. EXECUTIVE SUMMARY, PRELIMINARY SUPPLEMENT I,
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 604 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART I. EXECUTIVE SUMMARY, PRELIMINARY SUPPLEMENT II,
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 605 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. A. AIR TRAVEL DEMAND ANALYSIS,
Systems Analysis and Research Corp Boston Mass
For primary bibliographic entry see Field 1C.
AD-655 606 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. B. COST PERFORMANCE.
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 607 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. C. SONIC BOOM.
Institute for Defense Analyses Arlington Va Economic and Political Studies Div
For primary bibliographic entry see Field 1C.
AD-655 608 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. D. ROUTE SIMULATION.
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 609 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. E. FINANCIAL CAPABILITY.
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 610 HC$3.00 MF$0.65

INDUSTRIAL-LOCATION THEORY IN THE ERA OF SUPER-CARGO AIRCRAFT,
Analytic Services Inc Falls Church Va
Irving Casey. Aug 67, 29p

Descriptors: (*Transport planes, Air transportation), (*Industries, Site selection), Cost effectiveness, Economics, Theory, Costs, Labor.

The report surveys classical theories of industry location and appraises their applicability in the 1970's, when very large cargo aircraft are expected to be introduced. Modifications of existing theory are considered toward the development of an extended general theory of location. Some preliminary observations are made on the effects of super-cargo aircraft on industry location. The study is one product of a program of private, self-sponsored research. The program has the objective of examining changes in industry location that could result from introduction of super-cargo aircraft such as the planned Boeing 747 subsonic jet transport. (Author)
AD-655 695 HC$3.00 MF$0.65

WELFARE, STATIC AND DYNAMIC SOLUTION CONCEPTS,
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
Martin Shubik. 20 Jul 67, 38p Rept no. Cowles Discussion Paper-230
Contract Nonr-3055 (01)

Descriptors: (*Economics, Mathematical models), Optimization, Behavior, Probability, Sociology, Game theory, Stability, Bargaining, Dynamics, Social communication, Organizations.

Some problems concerning preferences and solutions in static and dynamic economic models of oligopoly and of welfare are discussed. The relationship between optimizing economic processes and behavioral processes is explored. (Author)
AD-655 824 HC$3.00 MF$0.65

MEASURING THE QUANTITIES OF FIXED FACTORS.
Technical rept.,
Stanford Univ Calif Inst for Mathematical Studies in the Social Sciences
William M. Gorman. 1 Jul 67, 71p Rept no. TR-150
Contract Nonr-225 (50)

Descriptors: (*Industries, *Economics), Industrial production, Distribution (Economics), Money, Factor analysis, Set theory.

In a certain economy there are a number of variable goods, whose efficiency prices are the same in all firms, and of fixed inputs for which this need not be so. These fixed inputs fall into classes called factors. In the paper necessary and sufficient conditions are found for the existence of 'quantities' of these fixed factors in terms of which the production possibilities facing the economy as a whole can be specified. It turns out to be convenient to measure them in terms of their capacity to earn profits; that if so, analogous aggregates exist for each firm in terms of which its production possibilities can be specified, and that the quantities in the economy as a whole are the sums of those in the individual firms. The conditions for this to be possible are restrictive. In particular they imply that an extra unit of 'equipment', for instance, will be used in exactly the same way whichever firm gets its. (Author)
AD-655 826 HC$3.00 MF$0.65

THE AGRICULTURAL LABOR FORCE AND POPULATION OF THE USSR: 1926-41.
Research memo.,
RAND Corp., Santa Monica, Calif.
Warren Eason. 4 May 54, 216p RM-1248

Descriptors: (*Economics, USSR), (*Agriculture, *USSR), Population, Labor, Statistical data, Tables.
Identifiers: Collective farming.

During the period of the first three 5-year plans, the economic and social structure of Soviet agriculture changed radically. There were 25 million individual farm households in 1928 and only 1 million by 1938. During this decade collective farming almost completely supplanted individual farming. In 1926 the number of persons with agriculture as their only or principal source of livelihood was 72 million, while by 1938 the number of such persons had fallen to 52 million. Over half of this decrease took place between 1935 and 1938. The population associated with agriculture pursuits decreased from 114 million in 1926 to 90 million in 1938, at which time it comprised 53 per cent of the total population of the USSR. The main purpose of this report is to document these findings. (Author)
AD-85 428 HC$3.00

RECENT TRENDS IN SOVIET TRADE,
RAND Corp., Santa Monica, Calif.
Oleg Hoeffding. 10 Oct 55, 31p RM-1567

Descriptors: (*Commerce, *USSR), Distribution (Economics), Foreign policy, Consumption, Economics.

The study deals with Soviet foreign trade with the free world and with the Soviet bloc during the postwar period, with particular emphasis on the developments of the years, 1953-1955.
AD-87 819 HC$3.00

COAL PROCESSING BY ELECTROFLUIDICS, PHASE II.
Iowa State Univ. of Science and Tech., Ames.
For primary bibliographic entry see Field 7A.
PB-174 927 HC$3.00 MF$0.65

COMBINED DESALINATION AND POWER GENERATION USING COAL ENERGY. PHASE II. INVESTIGATION OF EMERGING TECHNOLOGY, BY-PRODUCT RECOVERY, AND VERY LARGE CAPACITIES.
Kellogg (M. W.) Co., Piscataway, N. J. Research and Development Center.
For primary bibliographic entry see Field 7A.
PB-174 938 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE SMALL BREAD BAKERIES.
Agency for International Development, Washington, D. C. Communications Resources Div.
Mar 60, 63p
Prepared in cooperation with Holman (John F.) and Co., Inc., Washington, D. C.

Descriptors: (*Bread, Manufacturing methods), Industrial plants, Specifications, Industrial production, Costs, Labor, Economics, Power, Industrial equipment, Fuels, Transportation, Water.

Contents: General assumptions; Manufacturing operations; Plant site; Building requirements; Plant layout; Power; Water; Fuel; Transportation; Machinery and equipment; Production equipment; Direct labor requirements; Direct materials; Furniture and fixtures; Supplies; Cost breakdown per pound for white bread; Indirect labor cost; Depreciation; Manufacturing overhead; Manufacturing cost (annual); Fixed assets; Working capital; Capital requirements; Sales revenue; Recapitulation of costs, sales, and profits; Training; Sanitation; Safety; Conservation and accounting for losses in baking operations.
PB-175 523 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A BRASS FOUNDRY.
Revised ed.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
May 59, 85p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Industrial plants, Material forming), (*Brass, *Material forming), Management engineering, Copper alloys, Aluminum alloys, Magnesium alloys, Casting, Molding, Costs, Industrial equipment, Manufacturing methods.

The manual deals with subjects concerning brass foundry operations and techniques. However, matters pertaining to the casting of other metals in the nonferrous category have been included, since it is quite generally the practice in America to utilize identical facilities to cast brass, bronze, zinc, aluminum, magnesium and other nonferrous metals. The manual includes current costs of labor, machinery, equipment and supplies, as well as additional information relative to engineering, training, safety, markets, sales, financial and economic factors.
PB-175 524 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF MINERAL WOOL.
Revised ed.
Agency for International Development, Washington, D. C. Communications Resources Div.
Mar 62, 40p
Prepared in cooperation with Vitro Engineering Co., Washington, D. C.

Descriptors: (*Industrial production, *Thermal insulation), Manufacturing methods, Costs, Management engineering, Industrial equipment.

The purpose of this report is to present basic information relative to the establishment of a mineral wool plant in a foreign country. Mineral wool may be manufactured from rock, slag, or glass, any one of which may be processed from a molten state into a fluffy, light-weight mass of fine intermingled mineral fibers composed of complex silicates. This report pertains to the fabrication of loose and granulated mineral wool from slag. These materials are used mainly for thermal insulation by the building trades. When mineral wool is to be supplied to manufacturers of specialized acoustical and filter products, chemical analysis and control of the fiber and completed wool will be necessary to assure conformance to the customer's specifications. This plant will require a substantial capital investment and a reasonable number of skilled workmen. Raw materials should be available locally, particularly slag and coke. Generally, the less developed countries do not offer particularly favorable conditions for the production of mineral wool, nor a large enough domestic market to lead to a profitable venture. However, such a plant would be feasible in an industrially developing country where a large volume of new construction and industries would create a sufficient demand. A favorable factor would be association of the mineral plant with a factory processing high and low temperature mineral wool felts, industrial batts, blankets, blocks, boards, and molded pipe insulations. (Author)
PB-175 525 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF CANDY AND CONFECTIONERY.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Sep 57, 48p
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill.

Descriptors: (*Food, Manufacturing methods), Industrial plants, Industrial production, Specifications, Industries, Industrial equipment, Costs, Management planning.
Identifiers: Confectioneries.

Contents: Candy origin and usage; The candy industry; Requisites of successful confectionery manufacturing; Principal raw materials and their characteristics; Manufacturing processes of basic types of candy; Plant requirements - physical; Plant requirements - quality and costs; Cost ratios in the candy industry; Operating ratios in 1955 - typical for U. S. manufacturer-retailers; Financial forecast; Average cost per pound of selected ingredients used by the United States confection industry.
PB-175 526 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR PROCESSING OF DAIRY PRODUCTS.
Agency for International Development, Washington, D. C. Communications Resources Div.
May 62, 102p
Prepared in cooperation with Fehmerling Associates, Bridgeton, N. J.

Descriptors: (*Food, Processing), (*Milk, Processing), Industrial plants, Industrial production, Industrial equipment, Dehydrated foods, Power, Water, Fuels, Labor, Costs, Budgets, Economics, Instruction manuals, Specifications.
Identifiers: Dairy products.

The manual provides information on the processing of milk and other dairy products for human consumption. It is primarily intended to give the reader a basic understanding of production and marketing methods.
PB-175 527 HC$3.00 MF$0.65

SMALL BRASS FOUNDRY.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Oct 60, 35p TR-26072-PR
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Industrial plants, Material forming), (*Brass, *Casting), Castings, Industrial equipment, Management engineering, Costs.

The purpose of this report is to present basic information for establishing a brass foundry in a foreign country to produce brass castings. While the information shown in this report is based on brass products, other materials such as copper, aluminum and nonferrous alloys may be cast. (Author)
PB-175 532 HC$3.00 MF$0.65

CHEMICAL PROCESSING.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 7A.
PB-175 534 HC$3.00 MF$0.65

EXPERIENCE OF PRIVATE ENTERPRISE IN MANUFACTURING DEVELOPMENT IN UNDERDEVELOPED AREAS,
Columbia Univ., New York. Bureau of Applied Social Research.
A. J. Jaffe, Theresa R. Shapiro, and Carolyn Shilling. 30 Sep 57, 172p
Prepared in cooperation with Agency for International Development, Washington, D. C. Communications Resources Div.

Descriptors: (*Industrial production, *Economics), Management engineering, Industrial plants, Commerce, Employment, Personnel, Industries, Africa, Asia, Latin America.
Identifiers: Underdeveloped countries.

The information presented stems entirely from the actual experiences of nine underdeveloped countries in Africa, Asia, and Latin America. In these countries various manufacturing plants were started--some have succeed3d and some have failed. The available facts about them are reviewed in order to determine: (1) what industries have been the most successful and which the least; (2) what are the characteristics of the factories and industries which have been started, are continuing in operation and; hence, have presumably prospered. The findings when properly interpreted can be applied to countries other than those studied, where they can serve as guides for the development of manufacturing programs.
PB-175 536 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF NYLON HOSIERY.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Oct 61, 33p
Prepared in cooperation with Textile Associates, Inc., Boston, Mass.

Descriptors: (*Industrial production, *Socks), Management engineering, Manufacturing methods, Industrial plants, Site selection, Buildings, Power supplies, Fuels, Industrial equipment, Labor, Personnel, Costs, Money, Budgets, Safety, Training, Commerce, Law, Machines, Management planning, Nylon, Management control systems.
Identifiers: Nylon hosiery.

The purpose of this report is to present basic information for establishing a plant in a foreign country to produce women's full fashioned nylon hose from purchased nylon yarn. (Author)
PB-175 538 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF COTTON DRESSES.
Revised ed.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Apr 59, 40p
Prepared in cooperation with Methods Engineering Council, Pittsburgh, Pa.

Descriptors: (*Industrial production, *Clothing), Cotton textiles, Management engineering, Management control systems, Management planning, Manufacturing methods, Industrial plants, Site selection, Buildings, Power supplies, Industrial equipment, Fuels, Labor, Personnel, Costs, Money, Budgets, Safety, Training, Law, Machines, Commerce.

The cotton dress industry is described as one of the most competitive manufacturing businesses in the United States. For this reason, a great amount of effort has been applied to making the processes as efficient as possible. Despite rising costs of materials and labor, high productivity makes it possible to produce stylish, simple dresses that retail in the United States for three to four dollars. Most of these are produced in small and medium-sized factories such as the one described in this manual. (Author)
PB-175 539 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF SOUVENIRS AND SMALL JEWELRY.
Agency for International Development, Washington, D. C. Communications Resources Div.
Nov 56, 37p
Prepared in cooperation with H. D. Nottingham and Associates, Arlington, Va.

Descriptors: (*Castings, *Industrial production), Manufacturing methods, Industrial equipment, Industrial plants, Casting, Costs, Molding, Wood.
Identifiers: Jewelry.

The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. Three types of products have been considered. They are: conventional jewelry, ceramic souvenirs and jewelry and wooden souvenir products. Initial plant establishment may be any one of or combination of the three.
PB-175 540 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A JOB MACHINE SHOP.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
May 61, 49p
Prepared in cooperation with Methods Engineering Council, Pittsburgh, Pa.

Descriptors: (*Industrial plants, *Machining), Industrial equipment, Industrial production, Management engineering, Maintenance, Costs, Machine shop practice.

The purpose of this report is to present basic information for establishing and operating a job machine shop in a foreign country. The report includes current costs of labor, machinery, equipment and supplies, as well as additional information relative to engineering, training, safety, markets, sales, financial, and economic factors.
PB-175 541 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF FRUIT AND VEGETABLE JUICES.
Agency for International Development, Washington, D. C. Communications Resources Div.
Sep 62, 49p
Prepared in cooperation with Fehmerling Associates, Bridgeton, N. J.

Descriptors: (*Fruits, Beverages), (*Vegetables, Beverages), (*Beverages, Processing), Industrial plants, Manufacturing methods, Quality control, Specifications, Industrial production, Preservation, Industrial equipment, Site selection, Power, Water, Fuels, Labor, Costs, Budgets, Economics, Industrial procurement.

Contents: General assumptions; Product specifications; Production capacity; Manufacturing unit; Definition and classification of juices; Fruits and vegetables from which juices can be produced; Production procedures; Nectars; Use of preservatives; Quality control; Direct materials; Supplies; Plant layout; Plant site; Buildings; Power; Water; Fuel; Production equipment; Other tools and equipment; Furniture and fixtures; Direct labor; Indirect labor; Depreciation; Manufacturing overhead; Manufacturing costs; Fixed assets; Working capital; Capital requirements; Sales revenue; Recapitulation of costs, sales and profits; Budget control; Budget control accounts; Purchase requisition; Economics; Plant and operational requirements; Manufacturers of food processing equipment and supplies.
PB-175 542 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A WOOL SCOURING PLANT.
Agency for International Development, Washington, D. C. Communications Resources Div.
Mar 62, 48p
Prepared in cooperation with Thompson and Williams, Washington, D. C.

Descriptors: (*Fibers, Cleaning), (*Industrial plants, *Cleaning), Processing, Management engineering, Costs.

The purpose of this report is to present basic information relative to the establishment of a wool scouring (washing) plant in a foreign country. This plant will scour raw grease wool and bale the scoured wool on a commission basis. Charges for this service are applied on the grease wool weight and the owner accepts 50 to 60 per cent of the original weight in scoured wool free of most impurities. (Author)
PB-175 543 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A SEAFOOD PROCESSING PLANT.
Agency for International Development, Washington, D. C. Communications Resources Div.
Sep 62, 50p
Prepared in cooperation with Fehmerling Associates, Bridgeton, N. J.

Descriptors: (*Seafood, Processing), Industrial plants, Specifications, Frozen foods, Quality control, Industrial equipment, Power, Water, Fuels, Labor, Costs.

The purpose of the report is to present methods and information for processing fish, langosta and shrimp in various forms, preserved by freezing. Preserving of certain species of fish by brining and drying is also briefly discussed.
PB-175 545 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF PAINT AND VARNISH BRUSHES.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
May 69, 47p
Prepared in cooperation with Wolf Management Engineering Company, Chicago, Ill.

Descriptors: (*Paint applicators, *Industrial production), Manufacturing methods, Industrial equipment, Industrial plants, Costs.

The manual is designed to provide a general picture of the factors which must be considered in establishing and operating a small-scale factory of this type.
PB-175 546 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A PLANT FOR PLATING OF AUTOMOBILE PARTS.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Oct 61, 72p
Prepared in cooperation with Vitro Engineering Co., Washington, D. C.

Descriptors: (*Plating, *Industrial production), Metal coatings, Anodic coatings, Vehicle chassis components, Aluminum alloys, Steel, Brass, Zinc alloys, Electroplating, Industrial equipment, Industrial plants, Costs.

The publication describes processing and plant requirements for applying: (1) Decorative chromium coatings to automobile hardware made of steel, brass, aluminum and zinc die-casting alloys; and (2) Anodic coatings, both clear and colored, to parts made of aluminum alloys. (Author)
PB-175 547 HC$3.00 MF$0.65

HAND-MADE BLOWN GLASS AND FINE CAST CRYSTAL.
Technical inquiry service.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Jan 60, 36p
Prepared in cooperation with Aries Associates, Inc., Stamford, Conn.

Descriptors: (*Glass, Material forming), Manufacturing methods, Castings, Furnaces, Industrial production, Industrial plants, Management engineering, Costs.

The manufacture of glass products of artistic merit requires highly skilled and experienced artisans, not only for the design and execution of the finished articles, but for the formulation and manufacture of batches of fine glass and crystal of desired working properties and attractive color and lustre. This report emphasizes the process of making the glass batch itself, the plant and equipment required, and general procedures of furnace work and annealing, rather than the skilled techniques of blowing, pressing, cutting or engraving required to produce and decorate the finished article. The operation of the proposed plant consists essentially in the manufacture of batches of various types of glass, largely for inventory, and the working up of glass into finished articles in a sequence of operations, many of which proceed more or less independently of the glass manufacturing operation. (Author)
PB-175 549 HC$3.00 MF$0.65

GENERAL ECONOMIC FEASIBILITY STUDY IN PLATTE COUNTY, WYOMING.
Progress Engineering and Consulting Enterprise, Inc., Tulsa, Okla.
Mar 67, 77p
Prepared in cooperation with Economic Development Administration, Washington, D. C.

Descriptors: (*Economics, *Wyoming), Feasibility studies, Natural resources, Employment, Agriculture, Water supplies, Cost, Minerals, Industries, Recreation, Roads, Commerce.
Identifiers: Area redevelopment.

The economic feasibility study was conducted to determine which of the resources, if any, of Platte County, Wyoming, offer the greatest potential for development and job generation. The economy of the county was considered in these terms: Agriculture (farming, ranching, agricultural manufacturing); Mineral extraction; Manufacturing and manufacturing services; Recreation, tourism, hunting and fishing; Economic combinations. Natural resources, human resources, utilities, roads, government actions and potential, capital, markets, effort, attitudes and opportunity are considered under these headings.
PB-175 555 HC$3.00 MF$0.65

EXPANSION PROGRAM FOR THE INTER-TRIBAL INDIAN CEREMONIAL AT GALLUP, NEW MEXICO: A NATIONAL INDIAN MEMORIAL PARK.
Economics Research Associates, Los Angeles, Calif.
6 Jul 67, 210p
Prepared in cooperation with Economic Development Administration, Washington, D. C.

Descriptors: (*Economics, *New Mexico), Feasibility studies, Recreation, Costs, Site selection, Museums, Commerce, Employment, Culture.
Identifiers: Indians, Area redevelopment.

Since 1922 the Inter-Tribal Indian Ceremonial Association of Gallup, New Mexico has sponsored an annual four-day cultural-educational tourist attraction in Gallup called the Inter-Tribal Indian Ceremonial. The Ceremonial, which takes place in August and consists of Indian parades, dances, and sports contests, as well as a display and sale of Indian arts and crafts, is held at an old outdoor arena near the center of the city. This site must be abandoned to make way for Interstate 40, the Association being compelled to have a new Ceremonial site by 1969. The objectives of the study were to investigate the feasibility of expanding the Ceremonial concept to a year-round basis, to determine the potential impact on Gallup and the Indian, to recommend a new Association site, and to study the arts and crafts market and its trends to identify the effect of a new attraction on Indian arts and crafts.
PB-175 613 HC$3.00 MF$0.65

5D. History, Law, and Political Science

A SELECTED BIBLIOGRAPHY ON ECONOMIC DEVELOPMENT AND FOREIGN AID.
RAND Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 5C.
AD-206 551 HC$3.00

REVIEW OF 'THE EMERGENCE OF PAKISTAN',
Rand Corp Santa Monica Calif
Wayne Wilcox. Jul 67, 5p Rept no. P-3629
Submitted for publication in Asian Student.

Descriptors: (*Pakistan, Separation), (*India, *Great Britain), Government (Foreign), Political science, Economics, Religion, History, Budgets, Leadership, International law.

Not an academic effort at a balanced narrative. It is, however, the raw material for such analysis, and as such, an indispensable reference work for students of the country and of South Asian history.
AD-655 343 HC$3.00 MF$0.65

SPACE AND THE PROBLEM OF UNIVERSAL PEACE,
Foreign Technology Div Wright-Patterson AFB Ohio
G. P. Zhukov, E. G. Vasilevskaya, and P. I. Lukin. 27 Apr 67, 178p Rept no. FTD-MT-66-154
TT-67-62379
Edited machine trans. of mono. Kosmos i Problema Vseobshchego Mira, Moscow, 1966 195p.

Descriptors: (*International law, *Satellites (Artificial)), Disarmament, Space flight, Astronautics, Meteorological satellites, Communication satellites (Active), Communication satellites (Passive), Space communication systems, USSR.

At the experimental stage of using communication satellites and meteorological observations with the help of satellites, international collaboration is directed by decisions of international organizations, and is regulated by bilateral and multilateral international agreements. From that moment when two or more competing systems of world-wide communication are created, with the appearance in the sky of meteorological satellites of various countries, a vital necessity will appear for clearly developed international legal tools. International legal science is already being called now to work out just and expedient solutions which will be incorporated in international agreements.
AD-655 366 HC$3.00 MF$0.65

THE RAYLEIGH ARCHIVES DEDICATION.
Special repts. no. 63,
Air Force Cambridge Research Labs L G Hanscom Field Mass
J. N. Howard. Apr 67, 92p Rept no. AFCRL-67-0266

Descriptors: (*Libraries, Symposia), Scientific research, History, Rayleigh scattering, Rayleigh waves.
Identifiers: Rayleigh Archives, Archives.

On 30 March 1966 a ceremony was held at the Research Library of the Air Force Cambridge Research Laboratories, Bedford, Massachusetts, to dedicate the Rayleigh Archives: a collection of the notebooks, manuscripts, working papers, and correspondence of the Lords Rayleigh (John William Strutt, the third Baron Rayleigh, and Robert John Strutt, the fourth Baron Rayleigh). The ceremony was attended by a distinguished group from both the military and the scientific community whose research interests relate to the two Rayleighs. The report is a transcript of the discussions of 'Rayleigh Day,' with only a minimum of editing to correct minor errors that occurred in impromptu remarks. Contents include: Welcoming remarks at Rayleigh Day ceremony (by Dr. John N. Howard, Chief Scientist AFCRL; Colonel Robert F. Long, Commander, AFCRL; and Brigadier General Ernest A. Pinson, Commander, Office of Aerospace Research); Description of the material pertaining to the third Baron Rayleigh; Address by the Honorable Charles R. Strutt; Discussion of the scientific work of the third Baron Rayleigh (Scattering studies, Electrical studies, Argon and other studies); Comments by Professor Chapman on the influence of the fourth Baron Rayleigh on air glow and auroral research; Description of the material pertaining to the fourth Baron Rayleigh; Concluding remarks; Pictorial review of Rayleigh Day ceremony; Attendees at dedication ceremony; A summary of the AFCRL Rayleigh Archives.
AD-655 773 HC$3.00 MF$0.65

RECENT TRENDS IN SOVIET TRADE,
RAND Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 5C.
AD-87 819 HC$3.00

THE COPYRIGHT LAW AS IT RELATES TO NATIONAL INFORMATION SYSTEMS AND NATIONAL PROGRAMS: A STUDY BY THE AD HOC TASK GROUP ON LEGAL ASPECTS INVOLVED IN NATIONAL INFORMATION SYSTEMS.
Federal Council for Science and Technology, Washington, D. C. Committee on Scientific and Technical Information.
For primary bibliographic entry see Field 5B.
PB-175 618 HC$3.00 MF$0.65

5E. Human Factors Engineering

SONIC BOOM EXPERIMENTS AT EDWARDS AIR FORCE BASE.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 1B.
AD-655 310 HC$3.00 MF$0.65

HANDLING QUALITIES AND PILOT WORK LOAD,
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio Control Criteria Branch
C. B. Westbrook, R. O. Anderson, and P. E. Pietrzak. Sep 66, 36p Rept no. AFFDL-FDCC-TM-66-5

Descriptors: (*Pilots, Stress (Psychology)), (*Flight control systems, *Human engineering), Display systems, Simulation, Tracking, Decision making, Performance (Human), Stress (Physiology), Electromyography, Electrocardiography, Galvanic skin response, Eye, Measurement, Experimental design.

The paper defines the relationship between handling qualities and pilot stress and workload. The reasons underlying the importance of pilot workload measurement are discussed and ways to analyze or treat pilot vehicle systems are reviewed. The various measures of pilot workload that have been used or considered are discussed and some new data on the possible use of pupil dilation as a measure of stress are presented. (Author)
AD-655 340 HC$3.00 MF$0.65

STUDIES OF DISPLAY SYMBOL LEGIBILITY. PART XVI: THE LEGIBILITY OF TELETYPE-WRITER SYMBOLS ON TELEVISION,
Mitre Corp Bedford Mass
Glennis L. Bell. Apr 67, 51p Rept no. MTR-388 ESD-TR-67-104
Contract AF 19 (628)-5165
See also AD-641 926 and AD-654 670.

Descriptors: (*Television display systems, Visibility), (*Meteorological parameters, Television display systems), Reading, Symbols, Teletype systems, Visual signals, Human engineering.
Identifiers: Legibility.

The legibility of Long Gothic and Murray teletype symbol fonts was studied on television. Subjects identified light symbols on a dark background at four resolutions. The results showed that three special cloud-cover symbols were illegible for all resolutions studied. Under ideal conditions, 10 active lines per symbol height was the minimum recommended resolution for the alphanumeric symbols. The Long Gothic and Murray symbols were equally legible. It is recommended that more legible symbols be used for the three cloud-cover conditions. (Author)
AD-655 356 HC$3.00 MF$0.65

OPERATIONAL AND PHYSIOLOGICAL CHARACTERISTICS OF THE TANK T26E3.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 6S.
AD-655 570 HC$3.00 MF$0.65

DUST EXPOSURE IN ARMORED VEHICLES.
Final rept.
Army Medical Research Lab Fort Knox Ky
10 Sep 45, 6p

Descriptors: (*Tanks (Combat vehicles), *Human engineering), Dust, Military personnel, Exposure, Protective masks, Respiratory diseases, Hazards, Operation, Effectiveness, Performance (Human), Particle size, Desert tests.

Dust concentrations representing a wide variety of operating conditions and the free silica content of the respirable portions of dusts from operating areas were determined. These findings are considered in relation to the possible silicosis hazard among armored personnel. Owing to the low free silica content of the respirable dust, the flocculent nature of dust clouds and the limited duration of exposure, silicosis is unlikely in armored personnel as a result of their military operations. Dust generated by armored vehicles under extreme conditions of operation causes temporary discomfort and interferes with effective operations.
AD-655 574 HC$3.00 MF$0.65

CREW FATIGUE RESEARCH.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 6S.
AD-655 575 HC$3.00 MF$0.65

PLAN FOR FIRE CONTROL RESEARCH AND DEVELOPMENT.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 19E.
AD-655 577 HC$3.00 MF$0.65

FUNCTIONAL EVALUATION OF ELECTROLUMINESCENT PICTORIAL STATUS DISPLAYS.
North American Aviation Inc Anaheim Calif Autonetics Div
For primary bibliographic entry see Field 21D.
AD-655 690 HC$3.00 MF$0.65

EFFECTS OF PRIMARY TASK PERFORMANCE ON RESPONSE TIME TO TOGGLE SWITCHES IN A WORKSHOP CONFIGURATION.
Final rept. Oct 65-Feb 66,
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
Earl D. Sharp. Apr 67, 42p Rept no. AMRL-TR-66-190

Descriptors: (*Control panels, *Human engineering), (*Tracking, Performance (Human)), Toggle switches, Anthropometry, Spacecraft, Performance tests, Flight control systems, Analysis of variance.

The study was designed to determine interaction effects of central tracking performance and performance on variously located toggle switch controls. Subjects were required to operate toggle switches located in various positions to their left while maintaining control of a primary tracking task. Performance times for toggle switch operation and absolute integrated error scores corresponding to each toggle switch location were collected and analyzed. The results indicated that: (a) Variation of toggle switch location had no effect on tracking performance. (b) Vertical displacement of toggle switch controls affected only the reach time, while angular displacement affected only the manipulation time. The results of this study were compared with the results of a study completed earlier which used a centrally located fixation point rather than a tracking task. With the tracking task substituted in place of the fixation point, the reaction time (the time to release the starting switch) to secondary control operations decreased. (Author)
AD-655 770 HC$3.00 MF$0.65

A COMPARISON OF COCKPIT WARNING SYSTEMS.
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1C.
AD-655 772 HC$3.00 MF$0.65

STUDIES IN DISPLAY SYMBOL LEGIBILITY. PART XVIII. THE RELATIVE LEGIBILITY OF UPPERCASE AND LOWER CASE TYPEWRITTEN WORDS,
Mitre Corp Bedford Mass
Glenn C. Kinney, and Diana J. Showman. Jun 67, 43p Rept no. MTR-394
ESD-TR-67-106
Contract AF 19 (628)-5165
See also AD-654 670.

Descriptors: (*Display systems, Visibility), Human engineering, Symbols, Typewriters, Reading, Performance (Human).
Identifiers: Legibility, Words.

The relative legibilities of common words typewritten in all-uppercase and all-lowercase letters were studied in three experiments. Human subjects identified the words shown one at a time for a short period. All-uppercase printing was found to be significantly more legible than all-lowercase in all three experiments. The 'word-form' of all-lowercase words was not found to influence word identification. The use of uppercase letters is recommended for displays. (Author)
AD-655 798 HC$3.00 MF$0.65

JOB PERFORMANCE AIDS AND THEIR IMPACT ON MANPOWER UTILIZATION,
Philco-Ford Corp., Palo Alto, Calif. WDL Div.
For primary bibliographic entry see Field 5I.
PB-175 608 HC$3.00 MF$0.65

5G. Linguistics

CROSSLANGUAGE STUDY OF PERCEPTUAL CONFUSION OF PLOSIVE PHONEMES IN TWO CONDITIONS OF DISTORTION,
Ohio State Univ Research Foundation Columbus
Sadanand Singh, and J. W. Black. 1966, 25p Rept no. 1002-112
Contract Nonr-495 (18)
Availability: Published in The Journal of the Acoustical Society of America v40 n3 p635-56 Sep 1966.

Descriptors: (*Speech recognition, Phonetics), (*Phonetics, Intelligibility), Speech, Speech transmission, English language, Bandwidth, Auditory signals.

The intelligibility of /p t k b d g/ as spoken and heard by native speakers and listeners of Hindi and English and the relationship of this intelligibility to the transitions of consonants to vowels in CV monosyllables were investigated. Phoneme boundaries were determined. A measure of intelligibility was obtained in terms of information transmitted per stimulus for four and two separate channels and a composite channel. The separate channels represented distinctive linguistic features. Redundancy was quantified through a comparison of the information transmitted by these systems. There was uniformity among the four speaking-listening groups in information transmitted at six points of temporal segmentation and in 20 different bandwidths, as well as similarity in the importance of channels. Models of linearity were set to assess information as a function of (1) time, (2) width of the frequency band, and (3) lower frequency of the frequency band. Multiple correlations of 0.83 in the case of (1), (2), and (3), of 0.83 in the case of (1) and (2), and of 0.77 in the case of (1) and (3) were found. (Author)
AD-655 319 Not available from CFSTI.

5H. Man-Machine Relations

STUDIES OF DISPLAY SYMBOL LEGIBILITY. PART XVI: THE LEGIBILITY OF TELETYPE-WRITER SYMBOLS ON TELEVISION,
Mitre Corp Bedford Mass
For primary bibliographic entry see Field 5E.
AD-655 356 HC$3.00 MF$0.65

INVESTIGATIONS IN COMPUTER-AIDED INSTRUCTION AND COMPUTER-AIDED CONTROLS.
Massachusetts Inst of Tech Cambridge Engineering Projects Lab
For primary bibliographic entry see Field 5I.
AD-655 374 HC$3.00 MF$0.65

A COMPUTER SIMULATION EXPERIMENT OF SUPERVISORY CONTROL OF REMOTE MANIPULATION.
Final rept.,
Massachusetts Inst of Tech Cambridge Engineering Projects Lab
Simon G. McCandlish. Apr 67, 76p Rept no. DSR-79960-5
ESD-TR-67-290
Contract AF 19 (628)-3317

Descriptors: (*Automation, *Man-machine systems), (*Decision making, Human engineering), (*Computers, Simulation), Real time, Subroutines, Display systems, Control, Input-output devices.

The long term aim of this work is the modeling of the process by which the human commands and controls a real-time information system containing automatic subroutines which may be used to accomplish portions of the task. Remote manipulation is believed to have all the typical attributes of such a system yet be simple enough to be amenable to laboratory investigation. This report describes a computer simulation of a remote manipulation task and rate-controlled manipulator; into the latter was built some low-level automatic decision making ability which could be used at the operator's discretion to augment his direct continuous control. Under experimental investigation were

the effect of transmission delay, dynamic lag and intermittent vision on human manipulative ability. This report describes further experiments in which the operator called in sequence various on-site automatic control programs of the machine, and thereby acted as a supervisor. The results suggest that the supervisory mode of operation has some advantages when the task to be performed is difficult for a human controlling directly. Results show the supervisory mode to require more training than the direct mode.
AD-655 375 HC$3.00 MF$0.65

STUDIES IN DISPLAY SYMBOL LEGIBILITY. PART XVIII. THE RELATIVE LEGIBILITY OF UPPERCASE AND LOWER CASE TYPEWRITTEN WORDS,
Mitre Corp Bedford Mass
For primary bibliographic entry see Field 5E.
AD-655 798 HC$3.00 MF$0.65

STUDIES OF HUMAN DYNAMIC SPACE ORIENTATION USING TECHNIQUES OF CONTROL THEORY SEMIANNUAL STATUS REPORT, JUL. 1 - DEC. 31, 1966.
Massachusetts Inst. of Tech., Cambridge. Man-vehicle Control Lab.
Y. T. Li, and L. R. Young. Jan 67, 23p NASA-CR-85781, SASR-6
Grant NSG-577

Descriptors: *Dynamic model, *Human performance, *Space orientation, Apparatus, Behavior, Canal, Cathode, Control, Cue, Dimensional, Display, Dynamic, Eye, Human, Learning, Model, Motion, Movement, Orientation, Performance, Ray, Rotation, Semicircular, Simulator, Space, System, Theory, Three, Tube, Vestibular.

For abstract, see STAR 05 17.
N67-31474 HC$3.00 MF$0.65

5I. Personnel Selection, Training, and Evaluation

CIVILIAN/MILITARY COMPENSATION STUDY,
Naval Personnel Research Activity Washington D C
Simon Arzigian. Sep 62, 73p Rept no. PRAW-RS-62-25

Descriptors: (*Naval personnel, Wages), (*Civilian personnel, Wages), Government employees, Job analysis, Employment, Statistical data, Officer personnel.

An analysis is presented of compensation received in civilian employment as compared to that existing in the Naval service. The wages listed are basic wages, and do not include fringe benefits, bonuses etc. It must be pointed out that there are no clear-cut standards or criteria which may be used to equate military with civilian occupations. The results of this report indicate that there is a disparity between the pay of military personnel and those engaged in the same field of endeavor in the civilian industrial complex. The disparity is that the military are paid less than their civilian counterparts, and this disparity is more pronounced at the junior officer level than it is at the senior officer level. The same situation exists in a comparison of Navy ratings with related civilian occupations; namely, that Navy enlisted personnel receive less income than civilians engaged in the same type of work for performing the same duties. (Author)
AD-655 252 HC$3.00 MF$0.65

AN EXPLORATORY STUDY OF BRANCHING TESTS.
Technical research note,
Army Behavioral Science Research Lab Washington D C
A. G. Bayroff, and Leonard C. Seeley. Jun 67, 18p Rept no. BESRL-TRN-188

Descriptors: (*Military personnel, Selection), (*Test methods, Automation), Computers, Test construction (Psychology), Classification, Army personnel, Psychometrics, Statistical analysis.
Identifiers: Branching tests.

In the conduct of continuing research to improve screening and induction techniques, the INPUT QUALITY Task has explored the potential contribution of programmed testing particularly with respect to use of the branching technique which tests the examinee with items appropriate to his own ability level. The present publication reports on the trial administration of two branching tests by means of a computerized system with teletypewriter input/output developed by the National Bureau of Standards. A specific objective was to determine the comparability of computerized branching tests and conventional paper-and-pencil tests with reference to reliability, test score information, and test construction rationale. The two specially constructed 8-9-item branching tests (verbal and arithmetic reasoning) and corresponding conventional 40- and 50-item tests of the Army Classification Battery (ACB) were administered, in counter-balanced order, to a sample of 102 enlisted men. Statistical analyses of score results and observations of response patterns are presented. Findings indicated substantial correlation of the short branching tests with their longer conventional counterpart tests ($r = .83$ and .79, greater than would be expected with equally short conventional tests). Findings also reinforced the research promise of branching tests and indicated the need for reexamination of classical test theory. (Author)
AD-655 263 HC$3.00 MF$0.65

EFFECTIVENESS OF INCREASED REPETITION IN CLASSROOM LEARNING.
Staff memorandum,
George Washington Univ Alexandria Va Human Resources Research Office
Robert S. Beecrost, and Robert Annesar. Jul 57, 14p

Descriptors: (*Teaching methods, Effectiveness), Learning, Army training, Instructors.

The effectiveness of increased repetition of major points in three hours of instruction in elementary electricity was evaluated in the Wheel Vehicle Mechanic Course at Fort Jackson. Achievement was measured with multiple choice test items given in regular course examinations two days and 24 days following the instruction. The experimental instruction (increased repetition) improved achievement at both testing times. More low aptitude students instructed by the experimental method made passing scores on the test items at both testing times. It is recommended that repetition of major points be increased in classroom instruction. (Author)
AD-655 281 HC$3.00 MF$0.65

ANIP FLIGHT PATH GENERATOR FINAL REPORT AND MAINTENANCE INSTRUCTIONS: PHASE II.
Douglas Aircraft Co Inc El Segundo Calif
For primary bibliographic entry see Field 14B.
AD-655 298 HC$3.00 MF$0.65

FOREIGN SCIENCE BULLETIN, VOL. 3, NO. 6, 1967.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 20E.
AD-655 339 HC$3.00 MF$0.65

INVESTIGATIONS IN COMPUTER-AIDED INSTRUCTION AND COMPUTER-AIDED CONTROLS.
Final rept.,
Massachusetts Inst of Tech Cambridge Engineering Projects Lab
R. C. Rosenberg, S. G. McCandlish, and T. B. Sheridan. Apr 67, 29p
ESD-TR-67-289
Contract AF 19 (628)-3317
See also AD-640 681.

Descriptors: (*Programmed instruction, Effectiveness), Teaching methods, Computers, Automation, Man-machine systems, Teaching machines.

A summary is presented of two research projects in the area of computer-aided instruction and man-computer interaction. In 1965 Rosenberg completed a study entitled Computer Aided Teaching of Dynamic System Behavior (AD-640 681). This study demonstrated that within the delimited area of formal engineering theory a computer simulated laboratory could be built in which freshman students could pose problems, observe displays of machine responses, and thereby learn formal discipline with only minor interaction with a human teacher. An outline of Rosenberg's experiment and conclusions is given in this report, along with some more general 'Observations on the Use of Computers in Instruction,' dealing with prospects for computerized tracking monitors. In June 1966 McCandlish completed a study entitled A Computer Simulation Experiment of Supervisory Control of Remote Manipulation, (to be published). McCandlish summarizes how, for a formally well-defined task like grasping a block with a pair of jaws, removing the block from a hole and placing it in a second hole, the human can perform the task through the computer, but only with certain difficulties. He investigated such display rate, time delay between human responses and knowledge of results, and nature of command statements. An outline of McCandlish's experiment and conclusions is given in this report followed by 'Observations on the Relation Between Computer-Aided-Instruction and Computer-Aided-Control,' the latter being where the human serves as a supervisor and subgoal setter of a lower level semi-automatic system which interacts directly with the environment to accomplish a task. (Author)
AD-655 374 HC$3.00 MF$0.65

ABILITY, VALUES AND CONCEPTS OF EQUITABLE SALARY INCREASES.
Pittsburgh Univ Pa Management Research Center
For primary bibliographic entry see Field 5A.
AD-655 428 HC$3.00 MF$0.65

HOW TO SUCCEED IN BUSINESS ACCORDING TO BUSINESS STUDENTS AND MANAGERS.
Pittsburgh Univ Pa Management Research Center
For primary bibliographic entry see Field 5A.
AD-655 429 HC$3.00 MF$0.65

PRELIMINARY MANNING AND TRAININGS REQUIREMENTS FOR THE AUTOMATIC TEST SYSTEM (ATS) SS46-23X.
Research memo.,
Naval Personnel Research Activity San Diego Calif
Gordon S. Hulegaard. Jun 67, 43p Rept no. NPRA-SRM-67-24

Descriptors: (*Electronic technicians, Naval training), (*Test equipment (Electronics), Shipborne), Naval equipment, Maintenance, Maintenance personnel, Computers, Monitors, Data processing systems, Selection.

The report presents a projection of preliminary manning and training requirements for the Automatic Test System, a computerized test and monitoring system to be integrated with shipboard electronic suites. Performance monitoring and fault isolation testing from a centralized control console are new concepts in electronics maintenance and

will influence the training, assignment, and utilization of electronic maintenance personnel. (Author)
AD-655 432 HC$3.00 MF$0.65

PSYCHOMOTOR FUNCTIONS, THE BODY IMAGE, AND AVIATION,
Naval Personnel Research Activity San Diego Calif
For primary bibliographic entry see Field 5J.
AD-655 434 HC$3.00 MF$0.65

TEMPORAL AND LUMINOUS CALIBRATION OF THE NAVY FLASHBLINDNESS TRAINING DEVICE.
Naval Air Development Center Johnsville Pa Aerospace Medical Research Dept
For primary bibliographic entry see Field 14B.
AD-655 435 HC$3.00 MF$0.65

A DESCRIPTIVE LIST OF PLATO PROGRAMS.
Illinois Univ Urbana Coordinated Science Lab
For primary bibliographic entry see Field 9B.
AD-655 503 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION BASIC STUDY, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 510 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION PATIENT ACCOUNTING ANNEX A, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 511 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL REGULATING ANNEX B, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 512 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL SUPPLY ANNEX C, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 513 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL INTELLIGENCE ANNEX D, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 514 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL REPORTING ANNEX E, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 515 HC$3.00 MF$0.65

PRESELECTION TESTS.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 6N.
AD-655 573 HC$3.00 MF$0.65

THE AVIATION PSYCHOLOGY PROGRAM IN THE ARMY AIR FORCES,
Army Air Forces Washington D C Aviation Psychology Program
John C. Flanagan. 1948, 326p Rept no. 1
See also AD-651 778.

Descriptors: (*Military psychology, *Aviation personnel), Selection, Recruiting, Flight crews, Military training, Pilots, Navigator-bombardiers, Performance tests, Gunnery, Radar operators, Psychometrics, Instructors, Learning curves, Training devices, Teaching methods, Reaction (Psychology), Morale, Fear, Aerial warfare, Anxiety, Performance (Human), Stress (Psychology), Attitudes, Motivation, Adjustment (Psychology), Aptitude tests, Personality, Leadership, Behavior.

Contents: Origins and development of the aviation psychology program; Official directives on the organization and functions of the program; Selection and classification of air-crew personnel; Studies on the problem of evaluation proficiency; Findings regarding instructional problems in the flying training schools; Research on problems regarding operational procedures; Studies of individual reactions to combat; Individual differences and trait differences; Education and training and the evaluation of effectiveness; The design of equipment; Techniques of prediction and experimentation; List of official directives; Intercorrelations of tests and other variables in the experimental group and in samples of United States Military Academy Cadets.
AD-655 590 HC$3.00 MF$0.65

SOME TRENDS IN THE SUBMARINE SELECTION DATA FOR 1956-1957.
Memorandum rept.,
Naval Submarine Base New London Conn
Benjamin B. Weybrew. 22 Oct 57, 23p Rept no. SBNL-Memo-57-6

Descriptors: (*Submarine personnel, Selection), Performance tests, Students, Efficiency, Probability, Education, Psychometrics.
Identifiers: Personnel screening tests.

The assessment data accumulated during 1956-1957 were examined for evidence of the efficiency of the various selection measures to identify potential Submarine School failures. The results show the probability that a volunteer will graduate from Submarine School is 3-4 times greater if he has a combined Ari-Mech score of 100 or more than if he has a score less than 100. A similar margin in probability exists for high GCT scores and low Personal Inventory Barometer (PIB) scores. However, for those volunteers with low Ari-Mech scores, the odds to graduate are greatly increased if they (1) have completed 12 years or more of formal education; (2) have a PIB score in the satisfactory range; or (3) have a high GCT. An examination of the Ari-Mech scores of 3527 volunteers suggested that a cut-off of Ari-Mech of approximately 100 is still an optimum selection criterion. (Author)
AD-655 648 HC$3.00 MF$0.65

AN EXAMINATION OF THE BLAU-SCOTT AND ETZIONI TYPOLOGIES,
Ohio State Univ Columbus Behavioral Sciences Lab
For primary bibliographic entry see Field 5A.
AD-655 728 Not available from CFSTI.

ENGINEERING AND PUBLIC AFFAIRS: SOME DIRECTIONS FOR EDUCATION AND RESEARCH,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5K.
AD-655 759 HC$3.00 MF$0.65

AUTOMATED INPUT/OUTPUT DIAGNOSTICS FOR A REAL-TIME SIMULATION RESEARCH SYSTEM.
Final rept. Apr 64-Apr 65,
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
Don R. Gum, and Patricia A. Knoop. Oct 66, 167p Rept no. AMRL-TR-66-133

Descriptors: (*Training devices, Real time), (*Flight simulators, Digital computers), Analog-to-digital converters, Simulation, Multiplex, Digital-to-analog converters, Input-output devices, Systems engineering, Special purpose computers, Flow charting.

The report describes a library of automated diagnostic test-programs for the real-time input/output section of a digital training simulation research system. The application of such automated test to simulation-system acceptance testing is explored. Included is a description of real-time simulation as a training technique and the Real-Time Simulation Research Systems (RTSRS) for which the test-programs were prepared. Detailed program listings, flow charts, and abstracts of each test and of utility subroutines are also provided. (Author)
AD-655 771 HC$3.00 MF$0.65

MORALE AS A FUNCTION OF SELF-DEFINITION AND STAGE OF TRAINING,
Naval Aerospace Medical Inst Pensacola Fla
George E. Rickus, and Rosalie K. Ambler. 15 May 67, 14p Rept no. NAMI-1007

Descriptors: (*Aviation personnel, *Morale), Naval aviation, Students, Selection, Questionnaires, Analysis of variance.

Seven hundred and seven naval aviation trainees from three stages of training were administered an anonymous questionnaire that asked them to give their own definition of morale. They were then instructed to rate their own morale on a ten-point scale using their definition as a frame of reference. A content analysis of the definitions identified the following categories: task oriented, group oriented, and self oriented. Mean morale rates were obtained for the subjects falling in each of the definitional categories and stages of training. The results showed that morale increased as trainees progressed from pre-flight to basic flight training, that morale level varied as a function of the definition expressed, and that the definition expressed was a function of the stage of training experienced. (Author)
AD-655 818 HC$3.00 MF$0.65

PILOT PERFORMANCE, TRANSFER OF TRAINING AND DEGREE OF SIMULATION. II. VARIATIONS IN AERODYNAMIC COEFFICIENTS.
Technical rept. Sep 65-Oct 66,
Life Sciences Inc Fort Worth Tex
N. C. Ellis, A. L. Lowes, W. G. Matheny, D. A. Norman, and L. E. Wilkerson. May 67, 115p
NAVTRADEVCEN-1889-1
Contract N61339-1889

Descriptors: (*Pilots, *Transfer of training), (*Flight simulators, Computers), Simulation, Performance (Human), Aerodynamic characteristics, Feasibility studies.

Transfer of training studies were conducted to determine the training feasibility of simulations reduced by varying aerodynamic coefficients in two ways, rigid coefficients and least squares approximations to the coefficients. Experiment One incorporated the coefficient changes in the longitudinal mode; Experiment Two in the lateral mode; and Experiment Three in the combined longitudinal and lateral modes. On the basis of study results, it was concluded that feasibility of these reduced simulations as conditions for training was demonstrated. (Author)
AD-655 837 HC$3.00 MF$0.65

FROM OUTER SPACE BY PARACHUTE.
Volt Technical Corp., Washington, D. C.
For primary bibliographic entry see Field 5J.
For abstract, see STAR 05 17.
N67-30622 HC$3.00 MF$0.65

METAL-WORKING INDUSTRY TRAINING MANUAL.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
1957, 184p Technical Bull-62

Descriptors: (*Instruction manuals, *Machine shop practice), (*Industrial training, Material forming), Metals, Dies, Material removal, Heat treatment, Industrial equipment, Operation, Supervisory personnel, Management engineering.

The manual contains material about the manufacturing practices and operational methods in the metal-working industry, relating principally to the use of machine tools and related equipment for manufacturing component parts of final products. It explains the efficient utilization of metal-working equipment, and allied problems of tooling, plant lay-out, methods, and the development of a program to assist the industry on production problems through a training program. This training program has been developed for senior management personnel, work managers, and foremen for the proper selection of machinery; utilization of machine tools; layout of production line; design, use, and making of jigs and fixtures; problems involving setup, machine loading, machine speeds, testing and quality control, selection of cutting tools, tool designs, tool-making and tool maintenance; and safety devices and programs in the shop. (Author)
PB-175 521 HC$3.00 MF$0.65

EXECUTIVE'S ROLE IN AN ORGANIZATION.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5A.
PB-175 535 HC$3.00 MF$0.65

HUMAN RELATIONS IN MANAGEMENT.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5A.
PB-175 551 HC$3.00 MF$0.65

LINKING RESEARCH AND TEACHING. DESCRIPTION OF A LABORATORY COURSE RESULTING FROM A RESEARCH PROJECT AT A LIBRARY SCHOOL.
Western Reserve Univ., Cleveland, Ohio. Comparative Systems Lab.
For primary bibliographic entry see Field 5B.
PB-175 560 HC$3.00 MF$0.65

JOB PERFORMANCE AIDS AND THEIR IMPACT ON MANPOWER UTILIZATION,
Philco-Ford Corp., Palo Alto, Calif. WDL Div.
Albert B. Chalupsky, and Thomas J. Kopf. May 67, 101p WDL-TR-3276
Contract DL-81-05-67-06

Descriptors: (*Manpower studies, Performance (Human)), Reviews, Job analysis, Electronic technicians, Nurses, Hospitals, Display systems, Training devices, Efficiency.

The investigation was designed to review and synthesize the results of job performance aid research and application and to explore the current and potential impact of such aids upon industrial manpower utilization. The study involved a review and analysis of relevant research literature and reports of job aid applications. In addition, a field study was conducted of job performance aid usage in two distinctly different occupational areas: electronics assembly and patient care. Interviews were conducted in 24 organizations, twelve representing each occupational area. The results show that, depending upon their design and usage, job performance aids can compensate for lack of training and experience, improve job quality, and increase productivity. Evidence is generally lacking concerning the extent to which job performance aids can compensate for basic aptitude deficiencies. The impact of job aids is particularly apparent in complex or lengthy tasks, diminishing in effectiveness as tasks are subdivided into short cycle, repetitive operations. A basic framework for advancing the field of job performance aids is proposed and discussed. Recommendations are made for comprehensive job aid development and demonstration efforts. On a more basic level, a series of research questions are posed, the solutions to which would contribute to better understanding and long-term utilization of job aids. (Author)
PB-175 608 HC$3.00 MF$0.65

5J. Psychology (Individual and Group Behavior)

HUMAN REACTIONS IN DISASTER SITUATIONS.
National Opinion Research Center, Chicago, Ill.
Jun 54, 992p NORC-52
Contract DA-18-108-CML-2275

Descriptors: (*Behavior, *Disasters), Fear, Group dynamics, Leadership, Reaction (Psychology), Tornadoes.

During the period 1950-1954, the National Opinion Research Center conducted a series of psychological studies of community disasters occurring in various sections of the United States. This volume reports the findings of eight separate field investigations of community disasters, with particular emphasis on a study of the White County, Arkansas tornado of March 21, 1952.
AD-107 594 HC$3.00

PILOT STUDIES OF A SCOTOPIC SENSITIVITY TEST,
Naval Medical Research Lab., New London, Conn.
For primary bibliographic entry see Field 6P.
AD-159 358 HC$3.00

RELATIONSHIP OF GOAL LEVEL TO PERFORMANCE LEVEL,
American Institutes for Research Silver Spring Md
Edwin A. Locke. 6 Jun 67, 1p
Contract Nonr-4792 (00)
Availability: Published in Psychological Reports v20 p1068 1967.

Descriptors: (*Performance (Human), Motivation), Probability, Behavior.

Several previous studies (Locke, 1966) have yielded a positive, linear relationship between the level or difficulty of the goal assigned to S and quantity of output on 'brainstorming' tasks. However, the strength of the relationships may have been attenuated in these studies since Ss assigned easy goals usually exceeded these goals. This was prevented in the present study. Fifty-six male and 49 female paid, undergraduate, volunteers worked for 15 1-min. trials, the task being to list objects or things that could be described by a given adjective (e.g., 'heavy'). The adjectives were different for each trial. Goals were assigned in terms of the number of things S was to try and list. The goals were: 4 (N = 11), 8 (N = 17), 10 (N = 15), 12 (N = 41), and 13 (N = 21). A given S had the same goal on all 15 trials. Ss were told to stop working if they reached their goal before 1 min. was up. E checked the protocols for repetitions but not for quality of answers. Mean output quantity as a function of goal level, and probability of reaching the goal is shown in Fig. 1. The Pearson r between goal level and output was .88 ($p < .001$; N = 105). (Author)
AD-655 197 Not available from CFSTI.

AN EXPLORATORY STUDY OF BRANCHING TESTS.
Army Behavioral Science Research Lab Washington D C
For primary bibliographic entry see Field 5I.
AD-655 263 HC$3.00 MF$0.65

THE OCCURRENCE OF SYNKINESIS DURING KINESTHETIC POSITIONING RESPONSES.
Progress rept.,
Army Medical Research Lab Fort Knox Ky
Andree J. Lloyd. 24 Mar 67, 20p Rept no. US-AMRL-720

Descriptors: (*Positioning reactions, Accuracy), Muscles, Motor reactions, Extremities, Legs.
Identifiers: Kinesthesis, Synkinesis.

Ten right dominant and ten left dominant male subjects were measured to determine the relationship of ipsilateral and contralateral muscular activity during active and passive positioning of the lower legs to specified angular positions. Accuracy of positioning was significantly influenced by the goal positions and by the mode of movement. The range of greatest accuracy occurred from full extension through 50 degrees of flexion. As the degree of flexion increased from 60 to 110 degrees, the errors of positioning also increased in magnitude. The direction of the error was influenced by the mode of movement. Although no statistically significant relationships were determined to occur between position accuracy and the amount of contralateral muscular activity as measured by the electromyogram, it was determined that this low intensity synkinesis does exist in the muscles of normal human subjects. Contrary to previous research, increased contralateral muscle activity occurred only during the passive limb movements and, more specifically, passive movements of the nondominant limbs. It was concluded that the dominant influence on accurate positioning of a leg was the indirect influence of muscles on the joint receptors. An increase in muscle activity was concluded to produce an increase distortion on the articular capsule and initiate a noise in the afferent channels which the sensory system was unable to filter. The synkinesis was interpreted to result from an attempt by the afferent system to mimic the noise normally produced by the muscular activity of the actively moved limb. (Author)
AD-655 265 HC$3.00 MF$0.65

SOMATIC CORRELATES OF PSYCHOLOGICAL REACTION.
Washington School of Psychiatry D C
For primary bibliographic entry see Field 6P.
AD-655 287 HC$3.00 MF$0.65

SONIC BOOM EXPERIMENTS AT EDWARDS AIR FORCE BASE.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 1B.
AD-655 310 HC$3.00 MF$0.65

PITCH JUDGMENTS OF OCTAVE PURE TONES,
Ohio State Univ Research Foundation Columbus
Elca Swigart, and J. W. Black. 1967, 8p Rept no. 1002-113
Contract Nonr-495 (18)
Availability: Published in Journal of Auditory Research v7 p101-5 1967.

Descriptors: (*Pitch discrimination, Accuracy), Music, Decision making, Auditory perception, Auditory signals, Noise.

Twenty-four college music students judged the tonal height of seven octave pure tones, from A2 through A7, where A4 = 440 c/s, all of equal loudness. The largest number of errors occurred for the middle tones; thus, the greater accuracy occurred for the extreme tones. The largest percentage of errors (88.5%) were one-octave misses; two-octave errors were 10.7% of the total. A 2-sec burst of white noise between stimulus tones increased errors. Knowledge of the correct response for the preceding tone decreased error in judgment of the following tone. Errors of tonal height were more often higher than the true height with 'no knowledge' than with 'knowledge' of the true height of the previous tone. (Author)
AD-655 321 Not available from CFSTI.

HANDLING QUALITIES AND PILOT WORK LOAD,
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio Control Criteria Branch
For primary bibliographic entry see Field 5E.
AD-655 340 HC$3.00 MF$0.65

CONFIDENCE IN RECALL IN PAIRED-ASSOCIATE LEARNING EXPERIMENTS,
Electronic Systems Div L G Hanscom Field Mass Decision Sciences Lab
Elizabeth H. Nicol, Thorton B. Roby, and Francis M. Farrell. May 67, 26p
ESD-TR-67-457

Descriptors: (*Recall, Accuracy), Psychometrics, Word association, Learning.

The problem of estimating the accuracy of ones own recollections was investigated in four experiments under a variety of conditions. Subjects were shown a series of paired words; then they were shown the first member of the pairs and asked to recall the second member of each. Along with each attempt at recall the subjects were asked to give a confidence rating on a scale from 1 to 5. In all, 180 subjects were tested for a total 11,200 trials. The confidence results are highly significant, indicating that subjects were able to discriminate their correct recollections from mere guesses. Comparisons are presented showing how realism of confidence varies over the main experimental treatments: variations in meaningfulness of material, one versus two exposures to paired-associate lists, and presence of varying amounts of irrelevant material in the acquisition lists. (Author)
AD-655 349 HC$3.00 MF$0.65

RECEIVER OPERATING CHARACTERISTICS DETERMINED UNDER SEVERAL INTERAURAL CONDITIONS OF LISTENING.
Technical rept.,
Indiana Univ Bloomington Hearing and Communication Lab
David S. Emmerich. Jul 67, 104p
AFOSR-67-1561
Grant AF-AFOSR-548-67

Descriptors: (*Auditory perception, Auditory signals), Noise, Signal-to-noise ratio, Psychoacoustics, Performance (Human).

The ability of subjects to detect sinusoidal signals in a continuous background of white gaussian noise was investigated for several different interaural relations of the signal and of the noise stimuli. The functions relating the proportion of correct detections of the signal to the proportion of false alarms were determined in each case. These functions are referred to as receiver operating characteristics, or ROCs. A rating procedure was employed to determine the ROCs. The area under the ROC was found to be a good estimate of the percent correct obtained with a two-interval forced-choice technique -- a relation to be expected on theoretical grounds. The ROCs were not significantly affected by the presence of trial-by-trial feedback. In addition, the ROCs obtained when signals of differing intensity were mixed in blocks of trials were found to be quite similar to those obtained when only one signal intensity was presented in any given block of trials. (Author)
AD-655 386 HC$3.00 MF$0.65

ABILITY, VALUES AND CONCEPTS OF EQUITABLE SALARY INCREASES.
Pittsburgh Univ Pa Management Research Center
For primary bibliographic entry see Field 5A.
AD-655 428 HC$3.00 MF$0.65

HOW TO SUCCEED IN BUSINESS ACCORDING TO BUSINESS STUDENTS AND MANAGERS.
Pittsburgh Univ Pa Management Research Center
For primary bibliographic entry see Field 5A.
AD-655 429 HC$3.00 MF$0.65

PSYCHOMOTOR FUNCTIONS, THE BODY IMAGE, AND AVIATION,
Naval Personnel Research Activity San Diego Calif
Gary J. Tucker, and Roger F. Reinhardt. 8 Dec 66, 23p Rept no. NAMI-986
NAVMED-MR005.04-0019-1

Descriptors: (*Aviation personnel, Selection), (*Pilots, Stress (Psychology)), Anxiety, Motor reactions, Reaction (Psychology), Space perception, Proprioception, Psychomotor tests, Projective techniques.
Identifiers: Body image.

In the evaluation of aviators, and particularly student aviators, another source of anxiety -- unrelated to fears of death and mutilation, etc. -- has become evident. This is in the sphere of psychomotor adaption to the process of flying an airplane. In this report, a theoretical formulation of the process of learning to fly is presented in terms of the aviator's psychomotor function, body image, and ability to orient himself in space. Clinical and experimental evidence are presented to validate these theories. (Author)
AD-655 434 HC$3.00 MF$0.65

SUBJECTIVE ESTIMATION OF EFFORT, RESERVE, AND ISCHEMIC PAIN.
Interim rept.,
Army Medical Research Lab Fort Knox Ky
Lee S. Caldwell, and Richard P. Smith. 12 May 67, 16p Rept no. USAMRL-730

Descriptors: (*Pain, Perception (Psychology)), Exercise, Tolerances (Physiology), Thresholds (Physiology), Muscles, Contraction, Endurance, Hands, Stress (Physiology), Fatigue (Physiology).

Two studies were conducted to compare: (1) ratings of pain and effort induced by a muscle contraction maintained to the limit of endurance; and (2) estimates of effort and reserve using five- and ten-point scales both covering the same range of sensations. No overall differences were found between the ratings of pain and effort, though there was statistical evidence that the two scales diverged as the contraction time increased, or as the sensations increased in intensity. The rate of growth of the sensations of pain and effort were influenced by the strength of the muscle contraction. The ratings of effort and reserve were highly correlated, and significantly different only for the five-point scale. There was no indication of a divergence of the ratings of effort and reserve with contraction time. The results of both studies indicate that Ss are capable of reliably scaling the subjective experiences produced by strenuous physical exertions. (Author)
AD-655 568 HC$3.00 MF$0.65

THE AVIATION PSYCHOLOGY PROGRAM IN THE ARMY AIR FORCES,
Army Air Forces Washington D C Aviation Psychology Program
For primary bibliographic entry see Field 5I.
AD-655 590 HC$3.00 MF$0.65

VIGILANCE PERFORMANCE AND PHYSIOLOGICAL RESPONSES UNDER FIXED AND VARIABLE SIGNAL SCHEDULES.
Technical rept.,
Naval Training Device Center Orlando Fla
John L. Andreassi, Salvatore C. Rapisardi, and Patricia M. Whalen. May 67, 45p Rept no. NAVTRADEVCEN-IH-71

Descriptors: (*Attention, Performance (Human)), Reaction (Psychology), Reflexes, Responses, Galvanic skin response, Psychophysiology, Learning, Autonomic nervous system, Visual signals, Experimental design.
Identifiers: Heart rate, Palmar skin conductance.

The investigation was designed to: (1) determine the effects of signal patterning upon physiological responses and RT to the signals; and (2) provide some information with respect to the roles of expectancy and arousal in monitoring performance. Monitoring performance and physiological responses with variable interval (VI) and fixed interval (FI) signal patterns were studied in four Ss over an average of 10 days each. The Ss were required to expend some effort in order to obtain the critical signals. Reaction time (RT) was used as the performance measure while heart rate (HR), palmar skin conductance (PSC) and galvanic skin responses (GSRs) were the physiological measures. The RTs were significantly faster under the FI schedule than with VI. The PSC and GSR measures were significantly higher under FI than with VI, while HR was significantly greater with VI as compared to FI. Cumulative records showed typical response patterning to FI and VI schedules for three or four Ss. On the basis of these results it was suggested that: (1) faster RTs under the FI schedule reflect greater learning of the signal pattern under the FI schedule and perhaps the existence of an internal timing mechanism; (2) signal patterning does have an effect on physiological response and RT; (3) the difference between conductance phenomena and heart responses to the two signal patterns may be due to differential responsivity of the autonomic nervous system; (4) monitoring performance contains elements of both expectancy and arousal. (Author)
AD-655 619 HC$3.00 MF$0.65

AIR SICKNESS AND ANXIETY,
Naval Aerospace Medical Inst Pensacola Fla
For primary bibliographic entry see Field 6S.
AD-655 633 HC$3.00 MF$0.65

THE DEVELOPMENT AND USE OF THE PRIMARY AFFECT SCALE (PAS).
Research rept.,
Naval Medical Research Inst Bethesda Md
Eugene Johnson, III, and Thomas I. Myers. Jul 67, 19p

Descriptors: (*Emotions, *Psychometrics), Test construction (Psychology).

Ten verbal self-report scales were developed to measure subjective affect or feelings in five a priori areas: Happiness, Anger, Fear, Depression, and Arousal. Choice of measurement model, scaling procedures, and use of the scales are discussed. (Author)
AD-655 651 HC$3.00 MF$0.65

EFFECTS OF TEMPORAL VARIATION OF AUXILIARY LIGHT STIMULI UPON DETECTABILITY OF TONAL SIGNALS,
Electronic Systems Div L G Hanscom Field Mass
Decision Sciences Lab
William H. Watkins, and John R. Schjelderup. 17 Mar 67, 6p
ESD-TR-66-512
Availability: Published in Perception and Psychophysics v2 n7 p317-22 1967.

Descriptors: (*Auditory signals, Detection), Visual signals, Light, Stimulation, Hearing, Psychoacoustics, Auditory perception, Performance (Human).

Literature is surveyed briefly which reported the effect upon hearing of varying the onset of a light relative to the onset of a tone. Four forced-choice experiments involving approximately 32,000 trials of the four-alternative type are reported whose results show both similarities and differences when compared with earlier experiments which did not use forced-choice. Tentative conclusions derived from all the experiments described also take into account the effect of cessation of the light relative to the tone. (Author)
AD-655 691 Not available from CFSTI.

A CROSS-CULTURAL STUDY OF AUTHORITARIANISM,
North Dakota State Univ Fargo Dept of Psychology
Robert D. Meade, and James O. Whittaker. 26 Oct 66, 6p
AFOSR-67-1660
Grant AF-AFOSR-762-65
Prepared in cooperation with Western Washington State Coll., Bellingham. Dept. of Psychology.
Availability: Published in Journal of Social Psychology v72 p3-7 1967.

Descriptors: (*Social psychology, *Personality), Sociometrics, Personality tests, Leadership, Social communication, Statistical analysis.
Identifiers: Cross culture (Sociology).

The personality dimension, authoritariansim, was investigated in six culturally disparate groups of college students: Americans, Arabs, Rhodesian Africans (Mashona), Chinese, Indians, and Brazilians. Mean scores on the California F Scale were significantly lower for Americans than for any of the other groups. Brazilians scored significantly lower than all except Americans. Arabians and Chinese showed no difference and together constituted the next highest level of authoritarianism. Rhodesians and Indians exhibited no differences and together were highest in authoritarianism. Implications for further research in personality, leadership, and social relations employing this parameter of personality are discussed. (Author)
AD-655 731 Not available from CFSTI.

A DIFFERENTIAL COMPARISON OF TWO TYPES OF ELECTROPULSE ALPHABETS BASED ON LOCUS OF STIMULATION,
George Washington Univ Alexandria Va Human Resources Research Office
R. L. Brown, D. Nibarger, G. Ollie, and A. Soloman. 24 Apr 67, 11p Rept no. Professional Paper-32-67
Contract DA-44-188-ARO-2
Availability: Published in Perceptual Motor Skills v24 n3 p1039-44 Jun 1967.

Descriptors: (*Sensory perception, Accuracy), Skin, Electrodes, Pulse systems, Touch, Social communication, Stimulation, Analysis of variance.

Recognition accuracy was observed on 25 subjects with variation in the type placement (single- and multi-body regions) when varying numbers (1, 2, 3, 5, and 7) of electrode sites were pulsed simultaneously from among a 10-electrode array. Accuracy dropped drastically with increased number of sites pulsed and was most pronounced when the electrode array was restricted to a single region of the body. The accumulated data appear to cast serious doubt on the use of patterning of simultaneous electropulses as a fruitful approach to tactual communication. An alternative approach was proposed. (Author)
AD-655 746 Not available from CFSTI.

DISPLACEMENT AND THE SUMMATION OF FRUSTRATION,
Texas Univ Austin Dept of Psychology
Philip Worchel. Jul 67, 10p
AFOSR-67-1684
Contract AF 49 (638)-460
Availability: Published in Journal of Experimental Research in Personality, v1 n4 p256-61 1966.

Descriptors: (*Stress (Psychology), Reaction (Psychology)), Attitudes, Behavior, Anxiety, Social psychology, Factor analysis.

An attempt was made to explore the relationship between repeated frustrations and the displacement of aggression. The experiment consisted of a 2 X 2 X 4 factorial design: sex X self-ideal discrepancy X frustration. The four conditions of frustration involved the manipulation of threat to self-esteem by (1) the Experimenter alone (E); (b) the Assistant alone (A); (c) A followed by E; and (d) the Control (neutral). All Ss were administered the Self-Activity Inventory to obtain a measure of self-ideal discrepancy. Following threat arousal, the Ss were given a 'Test of Insight and Social Sensitivity' to assess their reactions to the E and themselves. The results indicated that (a) the Ss were significantly more hostile towards the E following the arousal of threat in the combined condition (A plus E) than in either of the Alone conditions (A or E); (b) that there were no differences in hostility between the A and E arousal condition; and (c) that A and E conditions produced significantly more hostility towards E than in the control condition. On the basis of the results, a sensitization theory of agression displacement was proposed. (Author)
AD-655 750 Not available from CFSTI.

MORALE AS A FUNCTION OF SELF-DEFINITION AND STAGE OF TRAINING,
Naval Aerospace Medical Inst Pensacola Fla
For primary bibliographic entry see Field 5I.
AD-655 818 HC$3.00 MF$0.65

EFFECTS OF TRANSVERSE G-STRESS ON RUNNING MEMORY.
Naval Air Development Center Johnsville Pa Aerospace Medical Research Dept
For primary bibliographic entry see Field 6S.
AD-655 835 Not available from CFSTI.

FROM OUTER SPACE BY PARACHUTE.
Iz Kosmosa Na Parashyute.
Volt Technical Corp., Washington, D. C.
V. Nikolayeva-tereshkova. 30 Mar 67, 5p
NASA-CR-84859, ST-MSF-10586
Contract NAS5-12487
Transl. Into English From Russian

Descriptors: *Astronaut performance, *Parachuting, Aircraft, Astronaut, Capability, Ejection, Environment, Load, Performance, Pilot, Work.

For abstract, see STAR 05 17.
N67-30622 HC$3.00 MF$0.65

NINETEEN SIXTY-SEVEN BEHAVIORAL MODEL OF MAN - HIS CHAINS REVEALED.
General Technical Services, Inc., Upper Darby, Pa.
A. Iberall, and W. Mc Culloch. Jul 67, 37p
NASA-CR-858, TR-5
Contract NASW-1066

Descriptors: *Brain, *Dynamic property, *Human behavior, *Physiochemistry, Behavior, Bibliography, Cell, Core, Dynamic, Elementary, Functional, Human, Model, Organization, Physiology, Property, Response, Structural, System.

For abstract, see STAR 05 17.
N67-31422 HC$3.00 MF$0.65

A STUDY OF LEARNING SYSTEMS OPERATING IN UNKNOWN STATIONARY ENVIRONMENTS.
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
For primary bibliographic entry see Field 9D.
PB-175 515 HC$3.00 MF$0.65

5K. Sociology

A U. S./VIETNAMESE CALENDAR OF HOLIDAYS AND CELEBRATIONS IN VIETNAM FOR THE YEARS 1955-1964,
American Univ., Washington, D. C. Special Operations Research Office.
Joann L. Schrock. 1965, 253p

Descriptors: (*Vietnam, Culture), Correlation techniques, Tables, Recreation, Religion, Government (Foreign), Laos, Cambodia.
Identifiers: Calendars, Holidays.

Contents: Summary and suggestions for the use of the calendars; U.S./Vietnamese calendar of holidays and celebrations in Vietnam; The Vietnamese lunar calendar and holidays; The Cambodian lunar calendar and holidays; The Laotian holidays, and tribal groups of Vietnam.
AD-454 030 HC$3.00

SHELTER ASSIGNMENT CONCEPT: A STUDY IN PUBLIC ACCEPTANCE,
Pittsburgh Univ Pa Dept of Sociology
Jiri Nehnevajsa. Apr 67, 104p
Contract DAHC20-67-C-0122

Descriptors: (*Fallout shelters, Public opinion), Civil defense systems, Acceptability, Sociology, Attitudes, Tables.

The report elaborates responses of 1,497 nationally sampled Americans to an item probing into desirability of providing the nation with assigned sheltering close to home and work by demographic, socio-cultural and selected attitudinal characteristics. The data are drawn from the 1966 field study. In this manner, the perspectives regarding shelter assignment are evaluated by 87 demographic, and 137 attitudinal, subgroups of our population. The findings indicate that the shelter assignment concept is quite acceptable to the nation. Unfavorable expressions occur with low frequencies, and only four of all the subgroups considered actually yield a negative desirability average in relation to the question. Of these subgroups, in fact, three represent respondents who assigned negative desirability values of (-1) or (-2) or (-3) on the overall scale (from +3 to -3) to Civil Defense efforts in general. By and large, and within the overall pattern of favorableness, the attitudinal variables (Cold War, Vietnam and similar factors) differenti-

ate among the respondent subgroups consistently more than do demographic characteristics. In view of the fact that positive assessments actually exceed two-thirds of the respondents and the concept disapproval is not typical of specific segments of our population, it is concluded that something of national consensus prevails with regard to the desirability of shelter assignment. (Author)
AD-655 270 HC$3.00 MF$0.65

ENGINEERING AND PUBLIC AFFAIRS: SOME DIRECTIONS FOR EDUCATION AND RESEARCH,
Rand Corp Santa Monica Calif
Edward H. Blum. Jul 67, 14p Rept no. P-3628
Presented to the Colloquium on Socio-Economic Planning, New York Academy of Sciences, 16 Mar 67.

Descriptors: (* Engineering, * Education), Interactions, Environment, Systems engineering, Urban areas, Transportation, Communication systems, Shelters, Clothing, Recreation, Management planning, Medicine, Mathematics, Social sciences, Problem solving, Economics.

In general, engineering and public affairs education should prepare a student to: (a) Possess the tools needed to obtain a quantitative understanding of technical and social phenomena and their interaction; (b) Be able to formulate and test predictive 'models' for the phenomena and their interactions; (c) Understand and be able to work with the environment; (d) Understand and be able to apply systematic methods for analyzing and synthesizing complex, interacting, large-scale systems, in which many things may be uncertain.
AD-655 759 HC$3.00 MF$0.65

WELFARE, STATIC AND DYNAMIC SOLUTION CONCEPTS,
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
For primary bibliographic entry see Field 5C.
AD-655 824 HC$3.00 MF$0.65

EXPANSION PROGRAM FOR THE INTER-TRIBAL INDIAN CEREMONIAL AT GALLUP, NEW MEXICO: A NATIONAL INDIAN MEMORIAL PARK.
Economics Research Associates, Los Angeles, Calif.
For primary bibliographic entry see Field 5C.
PB-175 613 HC$3.00 MF$0.65

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

ABSTRACTS FROM EAST EUROPEAN SCIENTIFIC AND TECHNICAL JOURNALS NO. 143 (BIOLOGY AND MEDICINE SERIES).
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6E.
AD-406 737 HC$3.00

BIOCHEMICAL FUEL CELL.
Melpar, Inc., Falls Church, Va.
For primary bibliographic entry see Field 10B.
AD-462 449 HC$3.00

RATIOS OF THE Fab FRAGMENTS I AND II FROM RABBIT ANTIBODIES AND NON-SPECIFIC GAMMA-GLOBULINS,
Indiana Univ Bloomington Dept of Chemistry
K. L. Knight, M. J. Roelofs, and F. Haurowitz. 19 Jul 66, 5p
Grants PHS-GM-01852, NSF-GB-2519
Research supported in part by AEC, Contract AT (11-1)-209.
Availability: Published in Biochimica et Biophysica Acta v133 p333-7 1967.

Descriptors: (* Antigens + antibodies, Separation), (* Gamma globulin, Separation), Chromatographic analysis, Rabbits, Serum albumin, Injection (Medicine).

The ratio (R) of fragment I/fragment II was determined in hapten-specific antibodies directed against Ars (-) and R4N (+), and in non-specific gamma-globulins of rabbits. The R values showed great individual differences, but were always higher in anti-R4N (+) than in anti-Ars (-) antibodies of rabbits injected with the doubly labelled Ars (-)-R4N (+)-bovine serum albumin antigen. The R values of the non-specific gamma-globulin were always greater than unity, indicating predominance of the more acidic fragment I over the less acidic fragment II. The R values showed no relation to the age of the rabbits, to repeated bleeding, nor to the repeated injection of Ars (-)-bovine serum albumin. (Author)
AD-655 198 Not available from CFSTI.

THE INTERACTION OF Hg (2+) AND METHYL MERCURY HYDROXIDE WITH E. COLI S-RNA,
Naval Medical Research Inst Bethesda Md
David B. Millar. 1 Jun 67, 7p
NAVMED-MR005.06.0001-36
Availability: Published in Biochemical and Biophysical Research Communications v28 n1 p70-5 1967.

Descriptors: (* Ribonucleic acids, Molecular association), (* Mercury compounds, Ribonucleic acids), Metalorganic compounds, Hydroxides, Chlorides, Molecular rotation, Thermal properties, Complex compounds, Fluorescence, Molecular structure, Amines, Imines.
Identifiers: Hydroxy methyl mercury, Mercuric chloride.

Results are presented of a study of the combination of divalent (mercuric chloride) and monovalent (methyl mercury hydroxide) mercury with E. coli S-RNA and the structural perturbations resulting from this reaction.
AD-655 204 Not available from CFSTI.

MODIFICATION BY HEXITOLS AND SUGARS OF CHANGES INDUCED IN YEAST BY STARVATION. I. DIFFERENCES IN CO2 PRODUCTION, O2 USE AND VIABILITY.
Final rept.,
Army Medical Research Lab Fort Knox Ky
Edward Spoerl, and R. J. Doyle. 26 Apr 67, 25p
Rept no. USAMRL-726
See also AD-652 704.

Descriptors: (* Yeasts, Starvation), (* Carbohydrates, Metabolism), Cells (Biology), Glucose, Carbon dioxide, Oxygen consumption, Viability.

Incubation of yeast cells for 21 hours in solutions of certain sugars and hexitols, including ribose, cellobiose, glucose, sorbitol and mannitol, produced cells capable of forming CO2 from glucose at a high rate and without an initial lag. This result contrasted markedly with a lag in output and a lower rate of CO2 output by cells incubated in water, i.e., starved. Incubation with other sugars and with other compounds, including amino acids, purines and pyrimidines, and organic and inorganic salts, was not effective in preserving CO2 output or reducing it. Usability of the compounds, measured by cell growth or by O2 uptake, was not correlated with the capacity to preserve CO2 output, though readily metabolized sugars at higher concentrations evidently caused an added loss of cell materials and reduced viability. Effective sugars functioned when included with ineffective compounds. Hexitols did not compete in this fashion and did not convert cells as rapidly as sugars to a condition which allowed them later to produce CO2 at a high rate. Oxygen uptake on different substrates was increased after some incubations, but viability was not increased above that of cells incubated in water. Materials lost from the cells during incubation were not identified as cofactors by the supplementation experiments carried out, though general stimulations were obtained. (Author)
AD-655 266 HC$3.00 MF$0.65

ERYTHROCYTE ACID PHOSPHOMONOESTERASE ACTIVITY IN NEWLY BORN CHINESE DEFICIENT IN GLUCOSE-6-PHOSPHATE DEHYDROGENASE,
Naval Medical Research Unit No 2 Taipei (Taiwan)
Tung-Cho Lu, Huoyao Wei, and R. Quentin Blackwell. 25 Feb 67, 6p Rept no. NAMRU-2-TR-271
NAVMED-MR005.09-0040.13
Availability: Published in Nature v213 n5077 p707-8 Feb 25 1967.

Descriptors: (* Phosphoric monoester hydrolases, Erythrocytes), (* Erythrocytes, Oxidoreductases), (* Oxidoreductases, Deficiency diseases), Infants, Saccharide phosphates, Etiology, Taiwan.
Identifiers: Jaundice.

Normal newborn Chinese infants were compared with others deficient in erythrocyte glucose-6-phosphate dehydrogenase (G-6-P D) activity for their levels of erythrocyte acid phosphomonoesterase activity and found to be similar. The mean plus or minus standard deviation values for the acid phosphomonoesterase activities in the 12 normal males, 11 normal females, and in the 14 males who were G-6-P D deficient respectively were 463 plus or minus 101, 408 plus or minus 94, 488 plus or minus 87 units per 100 ml of packed erythrocytes. These results indicate that there is no close association between the deficiencies of erythrocyte G-6-P D and erythrocyte acid phosphomonoesterase enzymes in Chinese. In addition, they indicate that deficiency of acid phosphomonoesterase activity is unlikely to be involved as an etiological factor in the normal jaundice among Chinese neonates. (Author)
AD-655 322 Not available from CFSTI.

THE EFFECTS OF ANTI-INFLAMMATORY DRUGS UPON THE CHEMISTRY AND ENZYMOLOGY OF RAT SKIN.
Revised ed.,
Children'S Hospital Washington D C Biochemical Research Lab
J. C. Houck, Y. M. Patel, and J. Gladner. 18 Nov 66, 13p
Grant PHS-AM-8168
Revision of manuscript submitted 11 Aug 66. Prepared in cooperation with Georgetown Univ. Medical School, Washington, D. C. and National Inst. of Arthritis and Metabolic Diseases, Bethesda, Md. Research supported in part by NONR.
Availability: Published in Biochemical Pharmacology v16 p1099-1111 1967.

Descriptors: (* Skin, * Peptide hydrolases), Drugs, Corticosteroid agents, Collagen, Ribonucleic acids, Hemoglobin, Fibrin, pH, Fibrinogen, Trypsin, Thrombin, Chymotrypsin, Blood coagulation, Inhibition, Steroids, Enzyme inhibitors.
Identifiers: Indomethacin, Oxyphenylbutazone.

Normal rats contain in the extracellular extrafibrillar compartment of their skin no proteolytic or 'free' collagenolytic activities. Within 26 hr after administration of cortisol, prednisolone, indomethacin, or oxyphenylbutazone, this cutaneous compartment demonstrated both a proteolytic and a free collagenolytic activity. Salicylate administration to rats did not produce these results. Associated with the appearance of these two enzyma-

tic activities in the extracellular compartment of the skin were supernormal amounts of RNA and normal or subnormal amounts of beta-glucuronidase activity. For these and other reasons it was felt that neither the proteolytic activity (maximal at pH 7.5) nor the collagneolytic activity (maximal at pH 5.5) was derived from the breakdown of intracellular lysosomes. Finally, paralleling the appearance of cutaneous, extracellular, free, collagenolytic activity was the loss of as much as 25-30 per cent of the insoluble collagen from the skin of these drug-treated rats. The extracellular, cutaneous proteolytic activity described above could digest hemoglobin and fibrin clots at pH 7.5 and convert fibrinogen to fibrin at the same pH. This enzyme activity could not attack the synthetic substrate appropriate to trypsin or thrombin but was active upon the substrate for chymotrypsin. Both the proteolytic and clotting activities were inhibited equally by p-chloromercurobenzoate, salicylate, and soybean trypsin inhibitor. Therefore this clotting activity was not due to thrombin but represents a hitherto unknown clotting activity found only in the skin of drug-treated rats. (Author)
AD-655 333 Not available from CFSTI.

OXYPEROXIDASE (THE REACTION OF FERROPEROXIDASE WITH OXYGEN),
Rome Univ (Italy) Istituto Di Chimica Biologica
Jonathan B. Wittenberg, Robert Noble, Beatrice A. Wittenberg, Eraldo Antonini, and Maurizio Brunori. 1966, 3p
AFOSR-67-1606
Grant AF-EOAR-22-66
Availability: Published in International Symposium on Comparative Hemoglobin Structure p132-3 Apr 13 1966.

Descriptors: (*Hemoglobin, Models (Simulations)), (*Peroxidase, Chemical reactions), Proteins (Conjugated), Iron compounds, Oxygen, Reduction (Chemistry), Blood chemistry, Spectroscopy, Dissociation, Italy.
Identifiers: Hemoproteins, Oxyhemoglobin, Oxyperoxidase.

The finding that ferrous peroxidase reacts with oxygen to form oxyperoxidase led to efforts directed at determining the ways in which this enzyme resembles and differs from oxyhemoglobin. The unique properties of oxyperoxidase are shown to offer a useful model for the mechanism by which hemoprotein terminal oxidases reduce oxygen.
AD-655 489 Not available from CFSTI.

ACTINOMYCIN D INHIBITION OF AMINO ACID TRANSPORT IN STREPTOCOCCUS FAECALIS,
City of Hope Medical Center Duarte Calif Dept of Biochemistry
Joseph T. Holden, and Nedra M. Utech. 29 Dec 66, 4p
Contract Nonr-2702 (00), Grant PHS-AI-01487
Availability: Published in Biochem. Biophys. Acta v135 p351-5 1967.

Descriptors: (*Amino acids, Inhibition), Transport properties, Streptococcus, Metabolism, Antibiotics, Tracer studies, Labeled substances, Glycolysis, Proteins, Biosynthesis.
Identifiers: Actinomycins.

Actinomycin D has been reported recently to inhibit respiration and glycolysis in human leukemic leukocytes, suggesting that the inhibition of DNA-directed RNA synthesis may not be the only metabolic effect of this substance. The reversal by glucose of actinomycin D inhibition of protein synthesis in ascites cells may reflect a related activity. While investigating the amino acid transport systems of Bacillus subtilis, it was found several years ago that the usefulness of actinomycin D as an inhibitor of amino acid incorporation into protein was limited in such experiments by its inhibition of amino acid transport. This effect has been examined further, and, in view of the current interest in additional metabolic effects of actinomycin D, the inhibition by this antibiotic of a-aminoisobutyric acid, cycloleucine, glutamic acid and leucine accumulation in Streptococcus faecalis is described.
AD-655 560 Not available from CFSTI.

THE LOW TEMPERATURE REACTION OF POLY U AND POLY A,
Naval Medical Research Inst Bethesda Md
David B. Millar, and Robert F. Steiner. Jul 67, 5p
NAVMED-MR006.06-0005-37
Availability: Published in Separatum EXPERIENTIA v23 p208-10 1967.

Descriptors: (*Ribonucleic acids, Chemical reactions), Polymers, Nucleotides, Thermal properties, Viscosity, Molecular structure, Helixes.
Identifiers: Polyriboadenylic acids, Polyribouridylic acids.

The temperature dependency of the reaction between polyriboadenylic acid and polyribouridylic acid was examined viscosimetrically. Time- and temperature dependencies of viscosities indicate that the helical content of polyribouridylic acid influences the reaction. (Author)
AD-655 675 Not available from CFSTI.

ISOLATION AND PROPERTIES OF POLYRIBOSOMES FROM CEREBRAL CORTEX,
Indiana Univ Bloomington Chemical Labs
Anthony T. Campagnoni, and H. R. Mahler. 4 Nov 66, 12p Rept no. Contrib-1411
Contract Nonr-908 (20), Grant NSF-GM-4855
Research supported in part by PHS.
Availability: Published in Biochemistry v6 p956-67 1967.

Descriptors: (*Ribosomes, Preparation), Cerebral cortex, Nerve cells, Nucleoproteins, Electron microscopy, Calcium, Magnesium, Sodium, Potassium, Amino acids, Ions, Rats.

A method is described for the preparation of ribonucleoprotein particles from rat cortical tissue without the use of detergent. The resulting population is polyribosomal in character with sedimentation coefficient values of 76, 118, 148, 176, 193, and 238 for the first six members. Sucrose density gradient analysis and electron microscopy support the assignment of the s values. In vitro protein synthesis was studied using these ribonucleoprotein particles. Optimal Mg (2+) concentration was about 10 mM. Ca (2+) had little effect when added to the standard incorporating system; however, upon replacing Mg (2+) with Ca (2+), with the total divalent metal ion concentration at 10 mM, an increase in (14C)leucine incorporation was observed over a fairly broad range followed by a rapid decline in incorporation upon further replacement of Mg (2+) by Ca (2+). The effects of K (+), NH4 (+), and Na (+) were studied and variations in activity between NH4 (+) and either K (+) or Na (+) appeared merely to be a linear function of the mole fraction of monovalent ions. Variations in the K (+):Na (+) ratio, with the total monovalent cation concentration at 140 mM, produced a different effect. Two maxima were observed; one at 124-128 mM K (+):16-12 mM Na (+) and another smaller one at about 90 mM K (+):50 mM Na (+). Finally, the incorporating system appeared to be stimulated by a mixture of 19 amino acids. About one-half of this stimulation could be accounted for by a mixture of the seven amino acids which have been shown to constitute over 80% of the free amino compounds found in (guinea pig) brains. (Author)
AD-655 676 Not available from CFSTI.

HYDROXYURETHANE: DICHOTOMY OF ACTION IN BACTERIAL AND ANIMAL CELLS,
Columbia Univ New York Dept of Microbiology
Robert M. Schmidt, Richard D. Pollak, and Herbert S. Rosenkranz. 6 Mar 67, 4p
Contract Nonr-266 (89)
Availability: Published in Biochimica et Biophysica Acta v138 p645-8 1967.

Descriptors: (*Antimetabolites, *Organic nitrogen compounds), Ureides, Desoxyribonucleic acids, Proteins, Biosynthesis, Inhibition, Mammals, Escherichia coli, Viability.
Identifiers: Hydroxyurethane.

Since hydroxyurea in vitro is inert towards DNA and DNA-synthesizing enzymes, it seemed likely that hydroxyurea is metabolized to an active intermediate prior to exerting its inhibitory effect. In search for such an intermediate, the metabolic effects of hydroxyurethane (CH3-CH2-O-CO-NHOH) were investigated. The results reported indicate that while DNA synthesis is the primary target of hydroxyurethane in mammalian cells, in bacteria this agent blocks protein production mainly.
AD-655 710 Not available from CFSTI.

IN VIVO EFFECT OF THE PARATHYROID EXTRACT ON NICOTINAMIDE ADENINE DINUCLEOTIDE COFACTOR LEVELS IN KIDNEY MITOCHONDRIA,
Naval Medical Research Inst Bethesda Md
R. Van Reen, M. Quesada, L. C. Costello, and L. L. Darago. 19 Oct 66, 4p
Availability: Published in Endocrinology v80 p542-3 Mar 1967.

Descriptors: (*Parathyroid glands, Tissue extracts), (*Parathyroid hormones, Nucleotides), Kidneys, Mitochondria, Injection (Medicine), Citrates, Oxidation.
Identifiers: Nicotinamide adenine dinucleotide, Nicotinamide adenine dinucleotide phosphate.

Rats were injected with parathyroid extract and the kidney mitochondria were isolated and assayed for nicotinamide adenine dinucleotide cofactors. Mitochondrial NADP and NADPH levels were significantly decreased as a result of parathyroid extract injection. No apparent alteration in the concentration of NAD or NADH was observed. The nucleotide cofactor concentrations of whole kidney homogenates were not affected by the parathyroid extract injection. The decreased mitochondrial NADP-NADPH concentration would account for the inhibition of isocitrate oxidation. (Author)
AD-655 717 Not available from CFSTI.

CHARACTERISTIC FLUORESCENCE OF PROTEIN AND NUCLEOLAR ACIDS IN THE CELL CENTERS.
Eigenfluoreszenz Von Proteinen Nukleinsaeuren Im Zellkern
Eidgenossische Technische Hochschule, Zurich (Switzerland).
W. Saurer. 1966, 24p DISS-3834
in German

Descriptors: *Biological cell, *Fluorescent emission, *Nucleic acid, *Protein, Acid, Biology, Cell, Emission, Excitation, Fluorescence, Intensity, Light, Liver, Nucleic, Nucleus, Quantity, Rat, Spectrum, Wavelength.

For abstract, see STAR 05 17.
N67-30764 HC$3.00 MF$0.65

TRANSPLANTATION IMMUNOLOGY STUDIES.
National Inst. of Allergy and Infectious Diseases, Bethesda, Md.
For primary bibliographic entry see Field 6E.
PB-175 582 HC$3.00 MF$0.65

IMMUNOCHEMICAL INVESTIGATION OF HUMAN LEUCOCYTE ISO-ANTIGEN PREPARATIONS OBTAINED FROM ESTABLISHED CULTURE CELLS.

Duke Univ., Durham, N. C. Medical Center.
For primary bibliographic entry see Field 6E.
PB-175 583 HC$3.00 MF$0.65

LEUKOCYTE TYPING IN HAWAII.
Kuakini Medical Research Inst., Honolulu, Hawaii.
For primary bibliographic entry see Field 6E.
PB-175 584 HC$3.00 MF$0.65

CHARACTERIZATION AND DEVELOPMENT OF A SOLUBLE HUMAN TISSUE ISOANTIGENIC PREPARATION FROM CONTINUOUS HETEROPLOID CELL LINES.
Duke Univ., Durham, N. C. Medical Center.
For primary bibliographic entry see Field 6E.
PB-175 585 HC$3.00 MF$0.65

PURIFICATION OF COMPLEMENT COMPONENTS AND PRODUCTION OF ANTI-COMPLEMENT REAGENTS.
Cordis Corp., Miami, Fla.
For primary bibliographic entry see Field 6E.
PB-175 586 HC$3.00 MF$0.65

TISSUE TYPING STUDIES.
National Inst. of Allergy and Infectious Diseases, Bethesda, Md.
For primary bibliographic entry see Field 6E.
PB-175 592 HC$3.00 MF$0.65

A COMPARATIVE STUDY OF SEROLOGIC TECHNIQUES FOR THE DETECTION OF ANTI-LEUCOCYTE ANTIBODIES AND CORRELATION OF THE RESULTS OBTAINED WITH THE RESPONSE TO SKIN HOMOGRAFTS IN HUMAN SUBJECTS.
Hospital Saint Louis, Paris (France). Institut de Recherches sur les Maladies du Sang.
For primary bibliographic entry see Field 6E.
PB-175 593 HC$3.00 MF$0.65

TESTING OF KIDNEY TRANSPLANT PATIENTS WITH LEUKOCYTE TYPING SERA AND PRODUCTION OF GROUPED ANTISERA.
California Univ., Los Angeles.
For primary bibliographic entry see Field 6E.
PB-175 594 HC$3.00 MF$0.65

PREPARATION AND USE OF BLASTOGENIC MATERIAL FOR UNIDIRECTIONAL TISSUE MATCHING.
McGill Univ., Montreal (Quebec).
For primary bibliographic entry see Field 6E.
PB-175 595 HC$3.00 MF$0.65

PREPARATION OF HUMAN TRANSPLANTATION ANTIGENS FROM BLOOD LEUCOCYTES.
New York Univ., N. Y. Medical Center.
For primary bibliographic entry see Field 6E.
PB-175 596 HC$3.00 MF$0.65

TRANSPLANTATION IMMUNOLOGY.
Leiden Rijksuniversiteit (Netherlands).
For primary bibliographic entry see Field 6E.
PB-175 597 HC$3.00 MF$0.65

6B. Bioengineering

THE MOTION OF LIQUID INSIDE A CLOSED VIBRATING VESSEL,
Vermont Univ Burlington
For primary bibliographic entry see Field 20D.
AD-655 749 Not available from CFSTI.

RESEARCH IN LIFE SCIENCES INSTRUMENTATION PERTINENT TO STUDIES IN SPACE BIOLOGY QUARTERLY PROGRESS REPORT, 1 APR. - 30 JUN. 1967.
Franklin Inst., Philadelphia, Pa. Research Labs.
R. M. Goodman. 30 Jun 67, 7p NASA-CR-85913
Contract NSR-39-005-018

Descriptors: *Bioastronautics, *Brain, *Telemetry, *Temperature probe, Astronautics, Bioinstrumentation, Biology, Cerebrum, Design, Device, Frequency, Instrumentation, Modulator, Multichannel, Nervous, Probe, Recording, Sensor, Space, System, Temperature.

For abstract, see STAR 05 17.
N67-31419 HC$3.00 MF$0.65

6C. Biology

IRRIGATION AS A FACTOR IN THE ECONOMIC DEVELOPMENT OF THAILAND,
Special Operations Research Office, Washington, D. C. Counterinsurgency Iformation Analysis Center.
For primary bibliographic entry see Field 8H.
AD-464 900 HC$3.00

COCCIDIOIDIN SENSITIVITY IN GUINEA PIGS IMMUNIZED WITH KILLED ARTHROSPORES,
Army Biological Labs Frederick Md
For primary bibliographic entry see Field 6E.
AD-655 222 Not available from CFSTI.

THE PHYSICAL BASIS OF CODING AND RELIABILITY IN BIOLOGICAL EVOLUTION.
Progress rept.,
Stanford Univ Calif Biophysics Lab
H. H. Pattee. May 67, 40p Rept no. BL-193
Contract Nonr-225 (90), Grant NSF-GP-4121
Submitted for publication in Prolegomena to Theoretical Biology.

Descriptors: (*Genetics, Biophysics), Theory, Biology, Adaptation (Physiology), Molecules, Quantum mechanics, Enzymes, Reliability, Measure theory.
Identifiers: Coding (Genetics), Organic evolution.

The paper considers the following question: Are the characteristic processes of biological organisms understandable in terms of the basic laws of physics. It is shown that in spite of the many classical models of cellular structures and functions there are severe difficulties in accounting for the reliability of hereditary transmission in terms of the elementary laws of physics. It is proposed that the ultimate source of the unique distinction between living and nonliving matter does not rest on idealized classical models of macromolecules, template replication, or metabolic control, but on the quantitative reliability of molecular codes which can correlate the contents of a quantum mechanical description with its classical phenotypic expression. To understand such a correlation between quantum descriptions and the corresponding observable classical event requires a quantum theory of measurement applied to elementary molecular hereditary processes. Such a theory presents serious, though not insurmountable, conceptual and formal difficulties for the physicist. However, in spite of the unsolved theoretical questions certain necessary conditions can be specified for individual molecular coding structures. These conditions suggest that the seat of coding or measurement processes in living matter is the individual non-holonomic enzyme catalyst, although it is likely that other structures in the cell serve to increase the reliability of these codes. (Author)
AD-655 232 HC$3.00 MF$0.65

AN ILLUSTRATED KEY TO THE SPECIES OF WHALE-LICE (AMPHIPODA, CYAMIDAE), ECTOPARASITES OF CETACEA, WITH A GUIDE TO THE LITERATURE,
University of Southern California Los Angeles Dept of Biological Sciences
Yuk-Maan Leung. 15 Jul 65, 15p
Contract Nonr-228 (19)
Availability: Published in CRUSTACEANA v12 pt3 p279-89 1967.

Descriptors: (*Cetacea, *Lice), Mammals, Insects, Aquatic animals, Norway, Skin, Females, Males, Reproductive system.

Whale-lice (Amphipoda:Cyamidae) infest both whale-bone whales and toothed whales. The family is composed of five recognized genera with 16 species, excluding two unnamed species from Berardius bairdii. A table of cyamids and their hosts is included, which is based on the literature together with unpublished information. An illustrated key to the species is presented, as is a guide to the literature and a list of references. (Author)
AD-655 646 Not available from CFSTI.

TEMPERATURE PREFERENCE IN GOLDEN HAMSTERS,
Missouri Univ Columbia Space Sciences Research Center
M. R. Gumma, F. E. South, and H. N. Allen.
1967, 14p Rept no. A-487
Grants Nonr (G)-0001-65, PHS-GM-09584
Prepared in cooperation with New Mexico State Univ., College Park, Dept. of Psychology.

Descriptors: (*Hamsters, Behavior), Hibernation, Heat production (Biology), Environment, Temperature, Body temperature, Adaptation (Physiology).

The preferences of pre-and-post-hibernative hamsters for relatively cool (8C) or relatively warm (19C or 24C) environmental temperatures was tested in a T-maze using the method of forced choice to equate number of visits to, and total time spent in each environment. The findings of the experiment were: (1) pre-hibernative hamsters show a marked preference for an 8C environment to either a 19C or 24C environment, and (2) following arousal there occurs a shift in preference on the part of the hamsters to a 24C environment over one of 8C. The significance of these results is discussed in terms of possible purposive thermoregulatory behaviors. (Author)
AD-655 664 HC$3.00 MF$0.65

ELECTRICAL RESPONSES FROM THE EYE OF A LAND SNAIL,
Naval Medical Research Inst Bethesda Md
Howard L. Gillary, and Myron L. Wolbarsht. 6 Feb 67, 12p
Availability: Published in Revue Canadienne de Biologie v26 p125-34 1967.

Descriptors: (*Gastropoda, *Electroretinography), Eye, Optic nerve, Cornea, Photosensitivity (Biological), Responses, Adaptation (Physiology), Electrophysiology, Thresholds (Physiology), Light, Intensity.

Recording with wick electrodes from the isolated eye and optic nerve of the land snail, Otala lactea, showed a slow cornea-negative electroretinogram (ERG) in response to light and concomitant spike activity in the optic nerve. The response had a latency of several seconds and had no 'off' effect. Both the amplitude and latency of the ERG were linear functions of the light intensity over a range of several log units. The eye was markedly adapted by light. The latency decreased with increasing temperature. The amplitude was reversibly inhibited at high temperatures. The constant response action spectrum had a peak at 490 nm. It resisted fractionation by chromatic adaptation. The ERG seems to reflect the primary electrical events in

the outer segments during stimulation by light. Electrical stimulation of the preparation evoked a typical compound action potential in the optic nerve. When the current was near threshold, the amplitude was markedly increased by illuminating the eye. The time course, spectral sensitivity, dependence on light intensity, and adaptation of this light facilitating effect were all similar to those of the ERG. This effect seems to be due to the summation of the effects of electrical stimulation and light-evoked generator processes in the eye. (Author)
AD-655 674 Not available from CFSTI.

MECHANISM OF ACTION OF ABSCISSION ACCELERATORS,
Fort Detrick Frederick Md
F. B. Abeles. 13 Oct 66, 14p
Availability: Published in Physiologia Plantarum v20 p442-54 1967.

Descriptors: (*Plant tissue, Separation), Stimulation, Ethylenes, Growth substances, Inhibition, Aging (Physiology).
Identifiers: Abscission.

Abscission zone explants of Gossypium hirsutum L., Cassia fistula L., and Coleus blumei Benth. were used to investigate correlations between endogenous rates of ethylene evolution and time of abscission. Additions of 0.1 nl/ml ethylene to the explants markedly accelerated abscission; continuous aeration of the explants, to prevent accumulation of small amounts of endogenously produced ethylene, inhibited abscission compared with that of sealed controls. Substances that stimulated abscission simultaneously accelerated ethylene evolution on all three species and at any position of application. The positional effects of auxin are explained as being due to differences in transport in the explant. Thus, distally applied auxin inhibits abscission, regardless of the accelerated rate of ethylene evolution, by being rapidly transported to the abscission zone. Auxin applied proximally stimulates abscission because it is unable to move as rapidly to the abscission zone and the ethylene effect becomes dominant. Ethylene was found to be most effective on aged tissues, and it is concluded that abscission rates are determined by an increase in sensitivity of the tissue to the ethylene that is already being produced. (Author)
AD-655 679 Not available from CFSTI.

EFFECTS OF REDOX AND SULFHYDRYL REAGENTS ON THE BIOELECTRIC PROPERTIES OF THE GIANT AXON OF THE SQUID,
Massachusetts Inst of Tech Cambridge Dept of Biology
F. Huneeus-Cox, H. L. Fernandez, and B. H. Smith. 22 Dec 65, 15p
Contract Nonr-4012 (18)
Prepared in cooperation with Woods Hole, Mass, and Estacion de Biological Marina, Vina del Mar, Chile.
Availability: Published in Biophysical Journal v6 n5 p675-89 1966.

Descriptors: (*Cephalopoda, Electrophysiology), Thiols, Oxidation-reduction reactions, Nerve cells, Degradation, Excitation, Proteins.

The effects of internally and externally applied sulfhydryl reagents on the bioelectric properties of the giant axon of the squid Loligo pealeii and Dosidicus gigas were studied. Cysteine-HCl (400 mM, pH 7.3) was used to remove axoplasm from the perfusion channel. Oxidizing agents (1 to 60 mM) tended to increase the duration of the action potential and had a slow, irreversible blocking effect when perfused internally; the membrane potential was little affected. Reducing agents applied internally caused a decrease in the spike duration without affecting its height or the membrane potential, although at high concentrations there was reversible deterioration of the action potential. Both external and internal perfusion of mercaptide-forming reagents caused deterioration in the action and membrane potentials with conduction block occurring in 5 to 45 min. 2-mercaptoethanol reversed the effects. Thiol alkylating reagents, iodoacetate and iodoacetamide, were without effect. N-ethylmaleimide did, however, block. Tests with chelating agents for nonheme iron in the membrane brought about no change in the electrical parameters. The implications of the present findings with regard to the macromolecular mechanism of excitation are discussed. (Author)
AD-655 708 Not available from CFSTI.

LATE TERTIARY BIOSTRATIGRAPHY (PLANKTONIC FORAMINIFERA) OF TROPICAL INDO-PACIFIC DEEP-SEA CORES,
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8G.
AD-655 715 Not available from CFSTI.

EFFECT OF HYPOTHERMIA ON RENAL FUNCTION OF THE MARMOT, MARMOTA FLAVIVENTRIA,
Missouri Univ Columbia Space Sciences Research Center
Marvin L. Zatzman, Esther P. Thompson, and Frank E. South. 1967, 1p
Grants Nonr (G)-0001-65, PHS-GM-13960
Abstract Preprint for Fall Meetings (1967).
Availability: Published in The Physiologist.

Descriptors: (*Hypothermia, *Kidneys), Hibernation, Body temperature, Glucose, Excretion, Osmotic pressure.

Hypothermia is known to depress renal function in mammals, but little is known of the effects of cooling hibernants. Clearances of Polyethylene Glycol (m.w. 3700), inulin, creatinine and para-aminohippurate were determined prior to, during and following hypothermia (20 degrees C. rectal temperature). All clearances were reduced during hypothermia and increased toward initial values after the animal was rewarmed. Glucosuria resulted from hypothermia in all animals, while a diuretic response was not uniformly elicited. When diuresis occurred during hypothermia, urine osmotic pressures were reduced, but returned toward initial values when animals were rewarmed. (Author)
AD-655 716 Not available from CFSTI.

FURTHER COMMENTS ON REPLICATION IN (M, R)-SYSTEMS,
Chicago Univ Ill Committee on Mathematical Biology
Robert Rosen. 30 Jun 66, 6p
AFOSR-67-1705
Grant AF-AFOSR-9-65
Availability: Published in Bulletin of Mathematical Biophysics v29 p91-4 1967.

Descriptors: (*Genetics, Mathematical models), Metabolism, Biophysics, Biology.
Identifiers: Mapping (Genetics).

This note is devoted to the restatement and elaboration of results obtained in earlier work. It is shown that, in the class of abstract metabolic models called (M,R)-systems, the induced replication of 'genetic' components, when it exists, has the property that any two 'genetic' mappings which agree on any element of their common domain must be identical; i.e., that (M,R)-systems satisfy a kind of 'one gene-one enzyme' hypothesis. In the presence of further restrictions, we can recover our earlier assertion, that any two 'metabolic' maps of the system which agree on an element of their common domain must be identical. The resemblance of such conditions to the unique trajectory property of mechanical systems is noted. Finally, it is shown that the induced replication maps in (M,R)-systems, when they exist, have the property that the 'genetic' maps in (M,R)-systems are conserved through all possible changes of environmental alterations. This means that there is no 'Lamarckian' element in the replication of these systems; i.e., the only way to attack the 'genomes' in these systems is to operate on the 'genetic' maps directly, and not indirectly through the 'metabolic' part of the system. (Author)
AD-655 719 Not available from CFSTI.

BIOLOGICAL AND PHYSICAL REALIZATIONS OF ABSTRACT METABOLIC MODELS,
Chicago Univ Ill Committee on Mathematical Biology
Robert Rosen. Jul 67, 10p
AFOSR-67-1666
Grant AF-AFOSR-9-65
Availability: Published in Helgolander wiss. Meeresunters v14 p25-31 1966.

Descriptors: (*Physiology, Mathematical models), Optimization, Biology, Bionics, Biophysics, Metabolism, Design.

The general construction of relational models involves the ignoring of structural constraints, and therefore the class of possible physical realizations of a given relational model is generally much larger than the class of systems from which the model was abstracted. The virtues of this kind of generality are discussed. It is pointed out that, in order for relational arguments to make close contact with the body of experimental biological data, it is necessary to be able to pass from the general relational model to particular physical realizations of that model. The kinds of supplementary constraints which are required in order to do this are elaborated, and it is pointed out that criteria of optimal design are most powerful in this regard. Some suggestions are made for the application of such studies of alternate realizations to problems associated on the one hand with the origin of life and extraterrestrial life, and on the other hand with biomedical engineering and bionics. (Author)
AD-655 724 Not available from CFSTI.

ELECTRICAL AND BEHAVIORAL RESPONSES TO AMINO ACID STIMULATION IN THE BLOWFLY,
Naval Medical Research Inst Bethesda Md
Myron L. Wolbarsht, and Frank E. Hanson. 1965, 14p
Availability: Published in Olfaction and Taste II, Proceedings of the International Symposium (2nd) p749-59 Sep 1965.

Descriptors: (*Chemoreceptors, Electrophysiology), (*Diptera, Chemoreceptors), (*Amino acids, Chemoreceptors), Proteins, Peptides, Taste, Responses, Nerve cells, Nerve impulses, Nutrition.

A series of amino acids and proteins was tested for electrophysiological and behavioral responses. No consistent positive responses were found. The proteins and amino acids were, with the exception of the very acidic amino acids, the equivalent of water. When the dicarboxylic amino acids and glutathione (pH about 3) were used as stimulus, the water fiber was not stimulated, but the salt fiber was inhibited during stimulation, and showed a post-inhibitory rebound following stimulus. Measurements of the receptor potential indicated that it is a summed potential from several neurons. It could not be regarded as a true generator potential, especially in the relation between the size and polarity of the receptor potential and the presence or absence of a certain type of impulse in any particular neuron. (Author)
AD-655 747 Not available from CFSTI.

FINE STRUCTURE OF THE ASEXUAL STAGES OF PLASMODIUM ELONGATUM,
Naval Medical Research Inst Bethesda Md
Masamichi Aikawa, Clay G. Huff, and Helmuth Sprinz. 15 Dec 66, 23p Rept no. Contrib-157
Availability: Published in The Journal of Cell Biology v34 n1 p229-49 1967.

Descriptors: (*Plasmodium, Life cycle), Erythrocytes, Birds, Parasites, Growth, Ingestion (Physiology), Bone marrow, Blood, Cytoplasm, Morphology (Biology).

Plasmodium elongatum, an avian malarial parasite, differs from other parasites by infecting both the circulating red blood cells and the hematopoietic cells. The exoerythrocytic development of P. elongatum occurs mainly in these red cell precursors. The fine structure of the asexual stages of P. elongatum was studied in the bone marrow and peripheral blood of canaries and compared with that of the asexual stages of other avian malarial parasites. With minor differences, the merozoites of P. elongatum possess the same organelles as those in the exoerythrocytic merozoites of P. fallax and the erythrocytic stages of P. cathemerium, P. lophurae, P. fallax, and P. gallinaceum. The developmental sequence is also essentially similar to that of other avian malarial parasites, in that upon entry into a new host cell, the dedifferentiation, growth, and redifferentiation phases take place. However, some important differences in the feeding mechanism of P. elongatum were found. The cytostome is involved in the ingestion of host cell cytoplasm in both exoerythrocytic and erythrocytic stages, in contrast to P. fallax, in which the cytostome is inactive in the exoerythrocytic stages. In P. elongatum, host cell cytoplasm is ingested through the cytostome, and 'boluses' are formed and incorporated into a large digestive vacuole. Subsequently, the digestion of the boluses takes place in this digestive vacuole. Thus, in regard to the function of the cytostome, the exoerythrocytic stages of P. elongatum appear to be closely related to the erythrocytic stage which has a feeding mechanism similar to that of the erythrocytic stage of other avian malarial parasites. (Author)
AD-655 748 Not available from CFSTI.

REPORT FROM THE INTERNATIONAL SUMMER INSTITUTE IN QUANTUM CHEMISTRY, SOLID-STATE PHYSICS, AND QUANTUM BIOLOGY HELD AT THE UNIVERSITY OF UPPSALA, UPPSALA, SWEDEN.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
For primary bibliographic entry see Field 20J.
For abstract, see STAR 05 17.
N67-30746 HC$3.00 MF$0.65

6D. Bionics

TECHNICAL CYBERNETICS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 9D.
AD-655 365 HC$3.00 MF$0.65

ELECTROCHEMICALLY ACTIVE, FIELD-TRAINABLE PATTERN RECOGNITION SYSTEMS.
Final rept. 1 Feb 66-30 Apr 67,
Space-General Corp Los Angeles Calif Center for Research and Education
R. M. Stewart, J. R. Milne, G. I. Hickey, and C. E. Hendrix, Apr 67, 84p Rept no. SGC-485/FR-3
Contract Nonr-4416 (00)

Descriptors: (*Pattern recognition, Electrochemistry), (*Electrolytic cells, Pattern recognition), (*Adaptive systems, Electrolytic cells), Iron, Gold, Filaments, Dendritic structure, Sensors, Electrodeposition, Nitric acid, Learning machines.
Identifiers: LIFT pattern recognition systems.

Research was directed toward the development of a new class of 'pattern recognition' equipment for rapid and automatic detection and/or classification of spatio-temporal patterns. One restricted but key class of systems was emphasized--functionally, adaptable linear decision functions; structurally, a homogeneous array of gold/iron dipoles in nitric acid which feed, in parallel, a low-impedance detector circuit--and means for direct excitation of such arrays by patterns of incident light. Theory shows that such a system (and some others) can be 'trained' through the agency of 'diffuse' or 'global' electrical shocks applied across the whole array immediately following each improper response in a training sequence and, thus, avoid the conventional requirements for detailed access, connecting, or 'internal' structuring and programming. During this process the size and structure (and, hence, function) of the dendrites is gradually altered in excited regions through differential dendritic electrodeposition and dissolution. When perfected and extended, this type of 'bulk' process and others like it should lead to pattern recognition machines reaching entirely new levels of packing density and versatility. Additional design data was acquired through a number of basic experiments and completed an experimental sixteen-element 'Linear Field-Trainable' (LIFT) array was completed together with compatible pattern input, control, and monitoring equipment.
AD-655 650 HC$3.00 MF$0.65

6E. Clinical Medicine

ABSTRACTS FROM EAST EUROPEAN SCIENTIFIC AND TECHNICAL JOURNALS NO. 143 (BIOLOGY AND MEDICINE SERIES).
Joint Publications Research Service, Washington, D. C.
22 Apr 63, 48p JPRS-18835
TT-63-21640

Descriptors: (*Medicine, Abstracts), Pharmacology, Drugs, Speech, Diseases, Poisoning, Surgery, Neurology, Reflexes, Stimulation, Plants (Botany), Biochemistry, Toxicity, Allergy, Cardiovascular system, Psychiatry, Medical equipment, Bibliographies.

Abstracts are presented of foreign research on biology and medicine.
AD-406 737 HC$3.00

OBSERVATIONS ON ENERGY METABOLISM IN IRREVERSIBLE HEMORRHAGIC SHOCK.
Annual progress rept. 1 Sep 55-31 Aug 63,
Wisconsin Univ., Madison. Medical School.
Helen Hift, and Charles W. Crumpton. Sep 63, 14p
Contract DA-49-007-MD-668

Descriptors: (*Shock (Pathology), Metabolic diseases), Hemorrhage, Metabolism, Biosynthesis, Heart, Microsomes, Liver, Blood chemistry, Blood transfusions, Hypoglycemia, Hypotension, Mitochondria.

Two unusual mitochondria were isolated from dogs subjected to prolonged oligemic hypotension: one from the liver appears to represent an adaptation to the abnormal physiological conditions imposed by the prolonged hypotension; the other, from the heart, seems to have sustained a permanent defect at the site concerned with ATP-synthesis. However, despite the presence of these abnormal mitochondria in the myocardium, there is no convincing evidence of any functional impairment of the heart as a whole. In both the dog and the rat the initial hemorrhage gives rise to a hyperglycemia, partly under adrenalin control. A peak concentration is reached at about the time of first reinfusion, after which a profound hypoglycemia is established which persists until death. In the rat survival appears somehow related to the maintenance of a hyperglycemic state. Despite persistantly elevated catecholamine levels in the circulating blood of experimental dogs, the hearts at the time of death are severely depleted of norepinephrine. (Author)
AD-416 333 HC$3.00

AQUEOUS ACRYLAMIDE GEL DUPLICATING MATERIAL,
Michigan Univ Ann Arbor School of Dentistry
E. R. Dootz, R. G. Craig, and F. A. Peyton. 1967, 9p
Contract DA-49-007-MD-938
Prepared for presentation at the Meeting of the International Association of Dental Research in Miami, Fla.
Availability: Published in The Journal of Prosthetic Dentistry v17 n6 p570-7 Jun 1967.

Descriptors: (*Dentistry, *Casting), Gels, Physical properties, Molding materials, Prosthetics, Teeth.

An aqueous acrylamide gel duplicating material was developed by modification of a commercially available acrylamide material. A synthetic calcium silicate was added for purposes of lowering the per cent strain from 35 to 24 per cent. A potassium alignate was added for the purpose of preventing sticking between the acrylamide gel and the master cast or refractory cast. The physical properties of the material in comparison with other commercial duplicating materials are not so different that this material should not be used as a substitute for agar hydrocolloids. It can be used with gypsum, phosphate, and silicate types of refractory cast materials by using appropriate mold washes. In addition, it is a duplicating material that allows a mold to be made of a master cast within 15 minutes after mixing. Therefore, the entire duplicating procedure can be accomplished in approximately one hour, depending on the type of refractory investment being used. (Author)
AD-655 196 Not available from CFSTI.

COCCIDIOIDIN SENSITIVITY IN GUINEA PIGS IMMUNIZED WITH KILLED ARTHROSPORES,
Army Biological Labs Frederick Md
James T. Sinski, and Frederic G. Dalldorf. 1965, 5p
Availability: Published in Proceedings of Coccidioidomycosis Symposium (2nd), Phoenix, Arix p175-8 Dec 8-10 1965.

Descriptors: (*Coccidioides, Immunity), Histology, Allergy, Antigens + antibodies, Injection (Medicine), Skin, Tests, Responses, Guinea pigs, Spores, Diseases, Symposia.
Identifiers: Skin tests.

Guinea pigs injected subcutaneously with Coccidioides immitis arthrospores developed sensitivity to coccidioidin skin testing after 1 1/2 weeks. At that time indurations 5 mm or greater in diameter were seen at 8 and 24 hours. Histologic features of a delayed hypersensitivity also appeared 1 1/2 weeks after immunization. This reaction consisted first of early neutrophilic infiltration of the dermis and subcutaneous tissues uniformly present at 3 hours and less marked by 48 hours. The second cellular feature was a later, variable mononuclear cell infiltration and was usually most marked at 24 and 48 hours. The acute inflammatory reaction was produced in both sensitized and control animals. The two groups differed in the degree of mononuclear cell infiltration, which occurred sooner and was more marked in the sensitized animals than in the controls. All agar gel precipitin-inhibition reactions were negative on sera from all animals tested. No immediate anaphylactic reaction was produced in immunized animals by intravascular injection of coccidioidin. Peritoneal cellular exudate, predominantly large mononuclear cells, from immunized, coccidioidin-positive donors transferred the hypersensitivity to control animals. Sera from similar immunized coccidioidin-negative donors failed to transfer the hypersensitivity. (Author)
AD-655 222 Not available from CFSTI.

TRENDS IN SYSTOLIC BLOOD PRESSURE IN THE THOUSAND AVIATOR COHORT OVER A 24-YEAR PERIOD,

Naval Aerospace Medical Inst Pensacola Fla
Albert Oberman, Norman E. Lane, William R. Harlan, Jr., Ashton Graybiel, and Robert E. Mitchell. 25 Apr 67, 27p Rept no. NAMI-1004 NAVMED-MF022.03-02-5007.15
NASA Order-R-136

Descriptors: (*Blood pressure, *Aging (Physiology)), Aviation medicine, Aviation personnel, Cardiovascular diseases, Hypertension, Obesity, Body weight.

A cohort of 1056 normotensive, healthy, young men initially examined in 1940 at the mean age of 24 years was followed at three periodic intervals until 1964. The cohort demonstrated little change in mean systolic blood pressure beyond age 35; a portion of this cohort showed no rise of systolic blood pressure with age. If the men are classified according to systolic blood pressure in 1940, those men in the upper quintile tend to remain high; when classified by quintile in 1951, those men at the extremes maintained their relative position for the period of the study. Predictive utility of a systolic blood pressure may be a function of its actual level as well as the age of the individual. Two factors further influenced the systolic blood pressure of this cohort, namely parental longevity and weight gain independent of arm circumference. The effect of those factors separately and in combination changed as the cohort grew older. (Author)
AD-655 250 HC$3.00 MF$0.65

ECOLOGY OF DENGUE AND OTHER ARBOVIRUSES OF MALAYSIA.
California Univ San Francisco George Williams Hooper Foundation
For primary bibliographic entry see Field 6F.
AD-655 288 HC$3.00 MF$0.65

RECOVERY OF EVOKED POTENTIALS IN VISUAL SYSTEM FOLLOWING INTENSE STIMULATION.
Texas Univ Austin Dept of Electrical Engineering
For primary bibliographic entry see Field 6P.
AD-655 398 Not available from CFSTI.

TUMOR REGRESSION BY MEANS OF AN EXTERNAL ELECTRICAL SOURCE: ANNOUNCEMENT OF PRELIMINARY FINDINGS.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Carroll E. Humphrey, E. H. Seal, and M. C. Garbow. 18 Dec 58, 44p Rept no. CF-2745-A
Contract NOrd-7386

Descriptors: (*Cancer, *Electrotherapy), Neoplasms, Inhibition, Mortality rates, Statistical analysis, Growth, Polarization, Mice.

In a series of preliminary studies it was found that the rate of growth of Sarcoma-180 could be reduced sharply in Swiss albino mice and complete tumor regressions were achieved. The method of treatment consisted of applying an external electrical potential of low magnitude to the animals in such a way that (1) the magnitude of the inherent tumor potential was exceeded, and (2) the inherent tumor-to-body polarity was reversed. In the first three experiments the S-180 inoculum was inserted percutaneously and the test mice groups were treated for seven days, destroyed and tumor weight and volume measurements were taken for both the treated (test) and untreated (control) groups. (Author)
AD-655 424 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION BASIC STUDY, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
1 Oct 65, 131p
Contract DA-04-495-AMC-671 (R)
See also AD-655 511.

Descriptors: (*Military medicine, Documentation), (*Medical personnel, Military medicine), Models (Simulations), Cost effectiveness, Reports, Medical supplies, Military intelligence, Data processing systems, Feasibility studies, Evacuation, Military organizations, Communication systems, Logistics, Management engineering, Hospitals, Job analysis.

The purpose of this document is to accomplish the following objectives: (1) To provide the technical rationale used in developing the documentation for specified functional areas. (2) To provide information concerning the organization and function of military staffs and general concepts of military organization and operations to the reader who is not as knowledgeable in such areas as the experienced military officer. (3) To show the relationship of the duties and responsibilities of the medical service staff officer to other staff functions within a military staff. (4) To define the function of medical units in a theater of operations. (5) To provide Functional Area Descriptions for the specified functional areas in sufficient detail to provide a basis for designing simulation models to be used in the cost-effectiveness analysis.
AD-655 510 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION PATIENT ACCOUNTING ANNEX A, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
1 Oct 65, 121p
Contract DA-04-495-AMC-671 (R)
See also AD-655 510.

Descriptors: (*Military medicine, Documentation), (*Casualties, Military medicine), Medical personnel, Models (Simulations), Cost effectiveness, Reports, Medical supplies, Military intelligence, Data processing systems, Feasibility studies, Evacuation, Military organizations, Communication systems, Logistics, Management engineering, Hospitals, Job analysis.

The Patients Accounting Functional Area is that process which provides for the collection, recording, summarizing, and reporting of data regarding patients hospitalized and/or evacuated in the Army in the field. It includes the responsibility for satisfying those essential patient data requirements of elements or agencies superior to, or in support of, medical treatment facilities in a theater of operations. This document describes the current patients accounting system in one division, one corps, one field army, and one theater army command. It is assumed that these operations will be applicable in all similar organizations, i.e. one division operation typifies all divisions, one corps typifies all corps, etc.
AD-655 511 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL REGULATING ANNEX B, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
1 Oct 65, 66p
Contract DA-04-495-AMC-671 (R)
See also AD-655 511.

Descriptors: (*Military medicine, Documentation), (*Casualties, Military medicine), Medical personnel, Cost effectiveness, Reports, Medical supplies, Military intelligence, Data processing systems, Feasibility studies, Models (Simulations), Evacuation, Hospitals, Military organizations, Communication systems, Logistics, Management engineering, Job analysis.

Medical regulating is that part of the overall sphere of medical operations which coordinates and controls the movement of patients to the medical facilities which are best able to provide care at that time. Many factors are considered in controlling the movement of patients through the hospitalization and evacuation system. Some of these factors are current bed status of treatment facilities (i.e., beds occupied, not occupied); surgical backlog in hours; location of facilities with specialty capabilities; number and location of patients by diagnostic category; tactical situation in the combat zone; location of airfields and railheads; medical resources available at each treatment facility; and availability of transportation.
AD-655 512 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL SUPPLY ANNEX C, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
1 Oct 65, 128p
Contract DA-04-495-AMC-671 (R)
See also AD-655 512.

Descriptors: (*Military medicine, Documentation), (*Medical supplies, Military medicine), Casualties, Medical personnel, Cost effectiveness, Reports, Military intelligence, Data processing systems, Feasibility studies, Models (Simulations), Evacuation, Hospitals, Inventory control, Logistics, Military organizations, Communication systems, Management engineering, Job analysis.

The operational objectives of medical supply are (1) to provide an adequate, timely, and constant supply of all items necessary to give complete medical service to every sick or injured individual in the command; (2) to provide maintenance of all items of medical equipment; and (3) to provide spectacle fabrication.
AD-655 513 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL INTELLIGENCE ANNEX D, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
1 Oct 65, 105p
Contract DA-04-495-AMC-671 (R)
See also AD-655 513.

Descriptors: (*Military medicine, Documentation), Ecology, Terrain, Plants (Botany), Animals, Nutrition, Environment, Diseases, Chemotherapy, Public health, Medical personnel, Training, Management engineering, Manpower, Hospitals, Medical supplies, Medical research, Military intelligence, Communication systems.

Medical Intelligence results from the collection, evaluation, analysis, integration, and interpretation of all available information which is immediately or potentially significant to military planning and which concerns factors that affect the health and welfare of man and animals in actual or potential areas of operations. The production of medical intelligence requires continuous collection of medical information on a world-wide basis. Medical information is defined as items of medical interest

or significance which have not been evaluated and interpreted in the perspective of military planning. The following categories of information are basic to the production of medical intelligence concerning any actual or potential area of operations: (1) Characteristics of the area of significance to military operations; (2) Diseases of man and animals; (3) Medical organization, administration, manpower; (4) Medical facilities, personnel, training; (5) Adequacy and availability of medical materiel; (6) Medical research and development; (7) Medical effects of weapons, including CBR.
AD-655 514 HC$3.00 MF$0.65

FUNCTIONAL AREA DESCRIPTION MEDICAL REPORTING ANNEX E, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
1 Oct 65, 111p
Contract DA-04-495-AMC-671 (R)
See also AD-655 514.

Descriptors: (*Military medicine, Documentation), Casualties, Hospitals, Reports, Medical personnel, Medical supplies, Statistical analysis, Cost effectiveness, Data processing systems, Feasibility studies, Evacuation, Management engineering, Job analysis.

Medical reporting is defined as the extraction of certain information from the patients' health and clinical records by the attending medical facilities and the subsequent summarizations of this information into statistical reports. These data are utilized by those who are directly administering medical and nursing care - surgeons and staff at command levels - and the Office of the Surgeon General (OTSG). The description of health and clinical records is included primarily to provide the consideration of such records as potential sources of information for medical reporting.
AD-655 515 HC$3.00 MF$0.65

TECHNICAL AND MEDICAL RESEARCH LIBRARIES AND INFORMATION CENTERS OF THE DEPARTMENT OF THE ARMY.
Army Natick Labs Mass
For primary bibliographic entry see Field 5B.
AD-655 535 HC$3.00 MF$0.65

THE CARDIAC OUTPUT AND VASCULAR RESPONSE TO TRAUMA.
Progress rept. 1 Jun 66-30 May 67,
Harvard Univ Boston Mass Medical School
George H. A. Clowes, Jr. 30 May 67, 48p
Contract DA-49-193-MD-2860
See also AD-436 045.

Descriptors: (*Cardiovascular system, *Shock (Pathology)), Stress (Physiology), Septicemia, Responses, Infections, Wounds + injuries, Metabolism, Blood circulation, Body temperature, Body fluids, Respiration, Blood vessels, Electrolytes (Physiology), Lungs, Biopsy, Necrosis.

Clinical and experimental observations were continued on the physiological role of the cardiovascular system in recovery from trauma, sepsis, and gangrene. Serial hemodynamic measurements including cardiac output were correlated with caloric energy expenditure, body water, respiratory function, and blood chemical alterations indicative of metabolic abnormalities. Excessive circulatory demand and reduction of the peripheral vascular resistance are in evidence. Explanations were sought for the mechanisms which interfere with the ability of the cardiovascular system to respond to this demand. Both the clinical observations and the experimental results employing a preparation with induced peritonitis suggest that myocardial failure, alterations of body water and electrolyte distribution, and a non-specific pulmonary inflammatory lesion accompanied by hypoxia all appear to be contributors to the low flow state. A method for studying the pulmonary hemodynamics and gas diffusion in intact animals was devised. Lung biopsies and cultures taken after the induction of peritonitis disclosed a monocytic infiltration of the septa, frequently in the absence of bacteria. Low flow states with high pulmonary vascular resistances were found to be associated with severe intracapillary red cell congestion. (Author)
AD-655 586 HC$3.00 MF$0.65

ONSET OF COCCIDIOIDOMYCOSIS IN MOUSE LUNG AFTER INTRAVENOUS INJECTION,
Army Biological Labs Frederick Md
James T. Sinski, and Peter J. Soto, Jr. 6 Jul 65, 7p
Availability: Published in Mycopathologia et Mycologia Applicata v30 n1 p41-6 4 Oct 66.

Descriptors: (*Coccidioides, Diseases), Pathology, Histology, Parenteral infusions, Lungs, Leukocytes, Spores, Lymphocytes, Mice.

Intravenous injection of mice with a massive dose of Coccidioides immitis fungal elements caused a moderate inflammatory response after 6 hours. It was composed of small focal collections of lymphocytes and neutrophils surrounding the rounded fungal elements in the mouse lungs. No further change was noted at 24 hours. Spherules with endospores varying in diameter from 15 to 40 microns were seen at 48 and 54 hours. Neutrophils persisted throughout this time and increased only minimally; the lymphocytic response was more marked at these later observations. (Author)
AD-655 662 Not available from CFSTI.

PARASITES IN SCHOOL CHILDREN OF I-LAN AND PENG-HU HSIENS; AND ADULTS IN I-LAN AND CHANG-HUA HSIENS, TAIWAN,
Southwest Foundation for Research and Education San Antonio Tex Dept of Parasitology
Robert E. Kuntz, and William H. Wells. 27 Jan 67, 13p
NAMRU-2-TR-272
Contract N00014-66-C-0094, Grant PHS-HE-03834-07
Availability: Published in Journal of Formosan Medical Association v66 n6 p300-7 Jun 28 1967.

Descriptors: (*Parasitic diseases, Taiwan), Children, Protozoa, Worms, Infections, Adults, Hygiene, Nematodes, Trematodes, Epidemiology.

Eight species of protozoa and 11 helminths were found in the 1,681 persons, including 6 groups of school children and 3 of adults. Infection rates for Entamoeba histolytica ranged from 0 to 23 percent with an absence of the parasite in one group of Taiwan Chinese school children. The greatest infection occurred in an isolated island community in which standards of living and personal hygiene obviously favored intestinal protozoan transmission. E. hartmanni was detected in all groups and the commensal, Dientamoeba fragilis, only infrequently reported for Taiwan, was detected in 4 of 9 groups sampled. The erratic occurrence of these and other intestinal protozoa suggests 'microcosm' situations in which propagation of protozoans may be characteristic of or restricted to limited foci. Ascaris and Trichuris were common in all populations and 100 percent of people in 2 of 9 groups were shown to be infected with the latter nematode. Hookworm was erratic in occurrence with lower rates of infection found in island populations. Four percent of children in one isolated island community were infected with Hymenolepis nana and 13 percent of aborigines sampled in northeastern Taiwan were infected with Taenia sp. Four species of trematodes were recorded: Clonorchis sinensis, Echinostoma revolutum, E. melis, and an unidentified heterophyid. Only a single heterophyid trematode infection was detected in man, although concurrent epidemiological investigations demonstrated domestic cats in the areas of study to be infected with several species known to infect man. (Author)
AD-655 670 Not available from CFSTI.

SURVEY OF INTESTINAL PARASITES OF SCHOOL CHILDREN IN KEE-LUNG SHIH; HUA-LIEN, TAO-YUAN, NAN-TOU, CHANG-HUA AND PING-TUNG HSIENS, TAIWAN,
Southwest Foundation for Research and Education San Antonio Tex Dept of Parasitology
Robert E. Kuntz. 27 Jan 67, 12p
NAMRU-2-TR-273
Contract N00014-66-C-0094, Grant PHS-HE-03834-07
Availability: Published in Journal of Formosan Medical Association v66 n6 p293-9 Jun 28 1967.

Descriptors: (*Parasitic diseases, Taiwan), Children, Protozoa, Worms, Nematodes, Trematodes, Infections, Epidemiology.

The report is based on information compiled over a period of several years in a broad parasitological program on Taiwan. A survey has been made of the intestinal protozoans and helminths of 961 school age children from eleven different schools on the island. Prevalence for the pathogenic Entamoeba histolytica ranged from 2 to 19 per cent, the latter occurring among peoples in a farm community living under substandard conditions obviously conductive to parasite infection. This group also showed the greatest infection rate for Ascaris which ranged from 9 to 92 per cent in populations sampled. Most of the subjects in this survey were well seeded with the more common nematode (Trichuris and hookworm) parasites of man. Trematodes were poorly represented with a single infection recorded for a heterophyid, Clonorchis and Paragonimus. Taenia occurred in 8 per cent of 116 aborigine school children. (Author)
AD-655 671 Not available from CFSTI.

ELECTROLYTE REPLACEMENT IN PAEDIATRIC CHOLERA,
Naval Medical Research Unit No 2 Taipei (Taiwan)
Lawrence S. C. Griffith, James W. Fresh, Raymond H. Watten, and M. P. Villaroman. 3 Jun 67, 12p Rept no. NAMRU-2-TR-274
Availability: Published in The Lancet p1197-0 June 3 1967.

Descriptors: (*Cholera, Electrolytes (Physiology)), Children, Adults, Excretion, Parenteral infusions, Sodium, Chlorides, Bicarbonates, Potassium.

Determination of electrolytes in the stools of 58 children with cholera from the Philippines revealed losses which are substantially different from those found in adults with cholera. Fecal losses of sodium, chloride, and bicarbonate are lower, and fecal losses of potassium are higher than in adults. Intravenous solutions for replacement therapy are commonly devised on the basis of the adult losses, and their use in pediatric cholera provides more sodium and chloride than is lost in the child's stool. Furthermore, such regimens rely too heavily on the oral route for administration of 'free' water. Most of the morbidity and mortality seen in pediatric cholera may be due to over-replacement of sodium losses and failure to provide 'free' water intravensously. (Author)
AD-655 672 Not available from CFSTI.

TRACE ELEMENTS AND DENTAL CARIES: MOLYBDENUM, ALUMINUM, TITANIUM,
Naval Medical Research Inst Bethesda Md
Robert Van Reen, Carl A. Ostrom, and V. J. Berzinskas. 1967, 9p
Availability: Published in Helv. odont. Acta v11 p53-9 1967.

Descriptors: (*Teeth, Diseases), Metals, Diet, Molybdenum, Aluminum, Titanium, Rats, Dentistry.

A series of experiments is described in which the possible cariostatic effect of molybdenum, aluminum, and titanium in good or water were tested. Approximately a 10% reduction in carious teeth and in severity scores was observed with 24 ppm molybdenum supplementation of the basal diet used by the New Zealand investigators. No effect of molybdenum was found when the basal diet of the Indiana University group was employed. No cariostatic effect was observed when the drinking water of the NMRI-D rat was supplemented with aluminum or titanium salts. The combined effect of molybdenum, aluminum, and titanium resulted in about a 10% reduction in severity scores and accumulated type I and type II lesions in rats fed a purified diet. The possible reasons for the relatively minor cariostatic effect of molybdenum in the NMRI-D rat compared to results with other strains of rats are discussed. (Author)
AD-655 680 Not available from CFSTI.

PROPHYLAXIS OF WARM-WATER-IMMERSION FOOT,
Naval Medical Field Research Lab Camp Lejeune N C
Larry J. Buckels, Kenneth A. Gill, Jr., and Gustave T. Anderson. Jul 67, 6p Rept no. Vol. 17/No. 6
Availability: Published in Journal of the American Medical Association v200 p681-6 May 22 1967.

Descriptors: (*Moistureproofing, *Silicones), Military medicine, Feet, Greases, Vietnam.

Warm-water-immersion foot has caused a large number of casualties among our troops fighting in Vietnam. A prophylaxis against this condition was studied. A silicone grease was applied to the feet of 52 men every 24 hours. Their feet were exposed to an occlusive, wet environment for five days. Mild or early changes of immersion foot developed in six of the men and all of the subjects completed the test. Six volunteers were exposed to the same wet conditions without using silicone grease; symptomatic immersion foot developed in five of these subjects and four were unable to continue in the test beyond the third day due to the severity of their symptoms. (Author)
AD-655 684 Not available from CFSTI.

AN EVALUATION OF SILICONE RUBBER TUBING AS A REPLACEMENT OF THE COMMON BILE DUCT,
Naval Medical Research Inst Bethesda Md
Bruce E. Bradley, Gordon C. Vineyard, Alfred Defalco, Dexter Lawson, and Jude R. Hayes. 1967, 8p
NAVMED-MR005.19.0004-16
Availability: Published in American Journal of Surgery v113 p501-6 Apr 1967.

Descriptors: (*Surgical techniques, *Silicone plastics), Biliary system, Prosthetics, Ducts, Obstruction (Physiology), Dogs.

Silastic tubing was used as a replacement of the common bile duct in nineteen animals, four of which had experimentally produced total obstruction of the common bile duct. Satisfactory function of the Silastic tubing as a bile conduit was observed in thirteen of the nineteen dogs. Common malfunctions encountered with synthetic replacement material for the common bile duct are discussed with reference to the use of Silastic tubing in this study. (Author)
AD-655 692 Not available from CFSTI.

THE SUSCEPTIBILITY OF MICE TO AIRBORNE INFECTIONS FOLLOWING CONTINUOUS EXPOSURE TO LOW DOSE RATE GAMMA RADIATION.
Annual progress rept. 1 Jan-31 Dec 66,
Naval Radiological Defense Lab., San Francisco, Calif.
Myron S. Silverman. Feb 67, 70p USNRDL-PR-67-2

Descriptors: (*Immunity, Whole body irradiation), Pasteurella tularensis, Radioprotective agents, Infections, Airborne, Mice, Phagocytes, Immune serums, Effectiveness, Dose rate, Gamma rays, Listeria monocytogenes, Antigens + antibodies, Biosynthesis, Resistance (Biological), Antigen-antibody reactions, Infectious diseases.

Continuous exposure to Co60 gamma irradiation delivered at 1.0-1.5 rad/hour increases the susceptibility of mice to subcutaneous and airborne infections with strains of Listeria monocytogenes and Pasteurella tularensis of relatively low virulence for non-irradiated mice. Although the irradiated mice were found to be fully as capable as non-irradiated mice of synthesizing antibodies against sheep red blood cells and of rejecting foreign skin grafts, survivors of an initial infection were less resistant to subsequent infection than non-irradiated mice. Data previously reported, together with the data from these experiments, suggest that macrophages of irradiated animals are readily injured by bacteria or their products. Hence, even immune macrophages may be unable to effectively destroy the invading bacteria. Preliminary results indicated that the protective effect of WR-1607, a radioprotective chemical may be abolished by subsequent infection with Pasteurella tularensis. (Author)
AD-806 757 HC$3.00 MF$0.65

BODY SEGMENT PARAMETERS.
New York Univ., N. Y. Research Div.
For primary bibliographic entry see Field 6P.
PB-174 945 HC$3.00 MF$0.65

ACUTE RESPIRATORY INFECTION IN SCHOOL-AGE CHILDREN.
Semi-annual contract progress rept. 1 Sep 66-1 Mar 67,
National Communicable Disease Center, Kansas City, Kans.
Tom D. Y. Chin. 1 Mar 67, 15p
Research supported in part by National Institutes of Health, Bethesda, Md.

Descriptors: (*Respiratory diseases, Children), Streptococcus, Parainfluenza virus, Herpes simplex virus, Adenoviruses, Vaccines, Influenza virus, Effectiveness.
Identifiers: Respiratory syncytial virus.

Acute respiratory disease (ARD) studies were conducted on 3,097 school children in Omaha, Nebraska. The greatest single cause of illness and absenteeism in these children was ARD. Samples were obtained from 230 absentees with complaint of respiratory illness. Group A streptococcus was the most common pathogen recovered; virus agents recovered included parainfluenza, herpes simplex, and adenovirus. A limited trivalent parainfluenza vaccine study was initiated in a population of nursery school children in Kansas City. Observations during the past year on a well controlled Alaskan Eskimo population revealed major outbreaks of parainfluenza, influenza, and respiratory syncytial viruses indicating that this population would be highly suitable for efficacy evaluation of parainfluenza and RS virus vaccines. (Author)
PB-174 998 HC$3.00 MF$0.65

TRANSPLANTATION IMMUNOLOGY STUDIES.
Repts. for Mar 66-Mar 67,
National Inst. of Allergy and Infectious Diseases, Bethesda, Md.
William Boyle, Mitsuo Yokoyama, Richard S. Metzgar, and Seymour P. Halbert. Mar 67, 53p
For descriptive text on each study, see PB-175 583 thru PB-175 586.

Descriptors: (*Transplantation, *Immunology), Leukocytes, Antigens + antibodies, Complement, Tissue culture cells.

Duke University began an immunochemical investigation of human leucocyte isoantigen preparations obtained from established culture cells. Initial work has established the presence of leucocyte isoantigens on KB cells by a number of serological methods. Kuakini Medical Research Institute is beginning the typing of leucocytes in Hawaii. Standardization and perfection of techniques for detection and identification of leukoantibodies is underway. Duke University has begun to characterize and develop a soluble human tissue isoantigenic preparation from continuous heteroploid cell lines. Cordis Corporation is purifying complement components and will produce anticomplement reagents. A number of lots of guinea pig serum were processed during the early phases of this contract's production program for human complement. (Author)
PB-175 582 HC$3.00 MF$0.65

IMMUNOCHEMICAL INVESTIGATION OF HUMAN LEUCOCYTE ISO-ANTIGEN PREPARATIONS OBTAINED FROM ESTABLISHED CULTURE CELLS.
Semiannual progress rept. 1 Sep 66-1 Mar 67,
Duke Univ., Durham, N. C. Medical Center.
William Boyle. 1 Mar 67, 12p
Contract PH-43-66-939
This report consists of pages 2-13. Order as PB-175 582.

Descriptors: (*Transplantation, *Immunology), (*Leukocytes, Antigens + antibodies), Tissue culture cells, Immune serums, Agglutinins, Toxicity, Cytology, Growth.

The major transplantation antigens in man appear to be present on peripheral leucocytes but these cells cannot be obtained in sufficient quantity from single individuals for isolation and characterisation of the antigens. Tissue culture cells were therefore examined as a potential continual source of antigen. Initial investigations established the presence of leucocyte iso-antigens on KB cells by a number of serological methods. Plasma membrane fragments were isolated and shown to be enriched in the leucocyte iso-antigens and these were obtained in a soluble form by digestion of KB cell membrane preparations. (Author)
PB-175 583 HC$3.00 MF$0.65

LEUKOCYTE TYPING IN HAWAII.
Semiannual progress rept. 1 Jul 67-30 Jun 68,
Kuakini Medical Research Inst., Honolulu, Hawaii.
Mitsuo Yokoyama. 1 Jul 67, 16p
Contract PH-43-66-923
This report consists of pages 14-29. Order as PB-175 582.

Descriptors: (*Transplantation, Immunology), (*Leukocytes, Antigens + antibodies), Genetics, Blood groups, Standardization, Tests, Identification, Immune serums, Hawaii.

The research involved mainly the standardization and perfection of techniques for detecting and identifying leuko-antibodies, the setting up of procedures and listing schedules conducive to productive study, and the organization of sources of leukocyte donors and pregnant women's sera. Other areas of activity included (1) procurance of antisera and (2) genetic studies on families for tracing genetic inheritance of leuko-antigens.
PB-175 584 HC$3.00 MF$0.65

CHARACTERIZATION AND DEVELOPMENT OF A SOLUBLE HUMAN TISSUE ISOANTIGENIC PREPARATION FROM CONTINUOUS HETEROPLOID CELL LINES.
Semiannual progress rept. 27 Jun 66-26 Jun 67,
Duke Univ., Durham, N. C. Medical Center.

Richard S. Metzgar. 26 Jun 67, 4p
Contract PH-43-66-928
This report consists of pages 30-33. Order as PB-175 582.

Descriptors: (*Cells (Biology), Antigens + antibodies), (*Transplantation, *Immunology), Immune serums, Inhibition, In vitro analysis, Stability, Storage, Temperature, Electrophoresis, Purification, Humans.

Most of the experiments and work was designed (1) to establish the serological specificity of the extracted antigens from several human cell lines by in vitro inhibition experiments and (2) to establish the stability of the extracted antigen on storage at various times and temperatures and (3) to acquire and make functional a preparative polyacrilamide column electrophoresis apparatus so that the crude serologically active material could be further purified and characterized. (Author)
PB-175 585 HC$3.00 MF$0.65

PURIFICATION OF COMPLEMENT COMPONENTS AND PRODUCTION OF ANTI-COMPLEMENT REAGENTS.
Semiannual progress rept.
Cordis Corp., Miami, Fla.
15 Feb 67, 20p
Contract PH-43-66-936
This report consists of pages 34-53. Order as PB-175 582.

Descriptors: (*Transplantation, *Immunology), (*Complement, Purification), Production, Guinea pigs, Humans, Tests, Preservation, Storage, Hemolysis.

Since preliminary data indicated that complement (C') may play a role in tissue transplantation rejection, the following tasks were performed: (1) Studies were conducted, leading to the production of human complement (C') components for delivery to a selected group of investigators. Efforts were made to obtain a yield of 250 ml per month. If deemed feasible, pilot studies were to be made using guinea pig serum, since more detailed data were available in the literature regarding the isolation of these components. (2) Human complement components were produced which can most easily be separated and most readily be made available to investigators. (3) Techniques were developed for the production of all other components and pilot amounts of as many as may be feasible were produced. (4) Studies were conducted, leading to long-term preservation of complement components. (5) Quality-control parameters were defined for the production and storage of complement components.
PB-175 586 HC$3.00 MF$0.65

TISSUE TYPING STUDIES.
Repts. for 1 Sep 66-1 Mar 67,
National Inst. of Allergy and Infectious Diseases, Bethesda, Md.
Ag. J. Dausset, Paul I. Terasaki, Louis Lowenstein, Felix T. Rapaport, and J. J. van Rood. 1 Mar 67, 52p
For descriptive text on each study, see PB-175 593 thru PB-175 597.

Descriptors: (*Transplantation, *Immunology), Serodiagnosis, Skin, Responses, Antigens + antibodies, Leukocytes, Kidneys, Tissues (Biology), Compatibility.

The selection of five semiannual progress reports covers part of the tissue typing program of the Transplantation Immunology Branch. The contracts are listed in the supplementary note. The reports include: (1) A comparative study of serologic techniques for the detection of antileucocyte antibodies and correlation of the results obtained with the response to skin homografts in human subjects; (2) Testing of kidney transplant patients with leukocyte typing sera and production of grouped antisera; (3) Preparation and use of blastogenic material for unidirectional tissue matching; (4) Preparation of human transplantation antigens from blood leucocytes, and (5) Transplantation immunology. The five reports are available as a single item from CFSTI.
PB-175 592 HC$3.00 MF$0.65

A COMPARATIVE STUDY OF SEROLOGIC TECHNIQUES FOR THE DETECTION OF ANTI-LEUCOCYTE ANTIBODIES AND CORRELATION OF THE RESULTS OBTAINED WITH THE RESPONSE TO SKIN HOMOGRAFTS IN HUMAN SUBJECTS.
Semiannual progress rept. 1 Nov 66-1 Mar 67,
Hospital Saint Louis, Paris (France). Institut de Recherches sur les Maladies du Sang.
Ag. J. Dausset. 1 Mar 67, 6p
Contract PH-43-65-986
This report consists of pages 2-7. Order as PB-175 592.

Descriptors: (*Transplantation, *Immunology), (*Leukocytes, Antigens + antibodies), (*Serodiagnosis, Antigens + antibodies), Skin, Humans, Pregnancy, Blood platelets, Immunity, Toxicity, Genetics, Identification, Blood groups, Immune serums, Lymphocytes, France.

The collection of sera possessing anti-leuco-platelet antibodies was pursued actively utilizing sera from multiparous women, sera from immunized volunteers and sera from polytransfused individuals. Systematic absorption experiments were carried out on sera, using both the lymphocytotoxicity test and the complement fixation on platelets. 1235 sera from multiparous women were tested for their anti-leucocyte or platelet activity; 82 large bleedings were made either from multiparous women or volunteers immunized; and 32 absorption experiments were carried out using 30 positive cells. The genetic studies of population made with these various sera led to the definition of three 'new' antigens: The antigen 11 probably identical with LA1; the antigen 12 negatively linked with antigen 1 (Mac) and which might be identical with antigen LA3; and the antigen 'Boum' also negatively linked with antigen 1 (Mac) and which is still under study. (Author)
PB-175 593 HC$3.00 MF$0.65

TESTING OF KIDNEY TRANSPLANT PATIENTS WITH LEUKOCYTE TYPING SERA AND PRODUCTION OF GROUPED ANTISERA.
Semiannual progress rept. 1 Sep 66-1 Feb 67,
California Univ., Los Angeles.
Paul I. Terasaki. 1 Feb 67, 6p
Contract PH-43-65-994
This report consists of pages 8-13. Order as PB-175 592.

Descriptors: (*Transplantation, *Immunology), (*Kidneys, Transplantation), (*Leukocytes, Blood groups), Immune serums, Antigens + antibodies, Toxicity, Lymphocytes, Viability, Compatibility, Mortality rates, Erythrocytes, Serodiagnosis.

Data on the specificities of 16 grouped antisera are given. A total of 240 retrospective kidney transplant pairs were tested by a lymphotoxic test. Patients who were matched for the major leucocyte groups survived at a higher rate than patients who were mismatched with their donors. Prospective kidney transplant recipients and donors were tested before transplantations. A program by which the 2 best matched recipients are selected out of a pool of patients for each available cadaver donor was initiated. The recipients were all pretyped and maintained by hemodialysis. Out of 43 prospective recipients and 10 prospective donors, 3 kidneys were transplanted. Leucocyte typing sera received from the NIH Serum Bank are being tested with kidney transplant patients and their donors. The lymphocyte cytotoxicity tests were utilized to study horse anti-human lymphocyte sera. The ALS sera have a markedly variable titer on different recipients, and currently this titer is being compared to the biologic effectiveness of the sera in kidney transplant recipients. A rapid metabolic screening test was developed to assess the viability of cadaver kidneys. A method was developed which provides pure lymphocyte suspensions with the minimum damage. An automatic locating device for recording the location of 60 droplets on a single microchamber was developed. A disposable plastic chamber for performance of the microdroplet test was designed and the tooling is now being made for commercial production. Improved methods of statistical analysis in typing were also devised. Red cell antigens were studied in 100 transplant patients. Cross checking of typing results with other laboratories was performed. (Author)
PB-175 594 HC$3.00 MF$0.65

PREPARATION AND USE OF BLASTOGENIC MATERIAL FOR UNIDIRECTIONAL TISSUE MATCHING.
Semiannual rept. 1 Sep 66-31 Jan 67,
McGill Univ., Montreal (Quebec).
Louis Lowenstein, and Bram Rose. 31 Jan 67, 13p
Contract PH-43-66-527
This report consists of pages 14-26. Order as PB-175 592.

Descriptors: (*Transplantation, *Immunology), (*Leukocytes, Antigens + antibodies), (*Radiation effects, Leukocytes), Cytochemistry, Separation, Electrophoresis, Radiological dosage, Radiobiology, Tissue culture, In vitro analysis, Desoxyribonucleic acids, Biosynthesis, Mitosis, X rays, Blood proteins, Tissues (Biology), Compatibility, Canada.

When leukocytes receive 1,500 r or more in vitro, they are rendered incapable of DNA synthesis and mitosis in mixed leukocyte cultures, but do not lose their ability to stimulate the blastogenesis of allogeneic intact leukocytes. It was found that the sum of the one-way reactions (irradiated A cells plus non-irradiated B-cells, and non-irradiated A cells and irradiated B cells) was equal approximately to the two-way reaction (A cells plus B cells). Therefore, the stimulatory activity of irradiated leukocytes is not modified quantitatively by exposing them to 2,000 r of X-irradiation. Filtration of cell free medium from mixed human leukocyte cultures on polycrylamide Biogel P-300 resulted in the isolation of two blastogenic fractions, 1 and 4. Fraction 1 was essentially free of plasma protein components, as determined by immunoelectrophoresis and acrylamide gel disc electrophoresis, while fraction 4 contained numerous plasma proteins. The data indicate that fraction 4 results from complexing of incorporated indicator with protein components of fractions 1, 2 and 3. Thus, active fractions 1 and 4 likely contain the same blastogenic factor. (Author)
PB-175 595 HC$3.00 MF$0.65

PREPARATION OF HUMAN TRANSPLANTATION ANTIGENS FROM BLOOD LEUCOCYTES.
Semiannual progress rept. 1 Sep 66-1 Mar 67,
New York Univ., N. Y. Medical Center.
Feleix T. Rapaport. 1 Mar 67, 10p
Contract PH-43-65-638
This report consists of pages 27-36. Order as PB-175 592.

Descriptors: (*Transplantation, *Immunology), (*Leukocytes, Antigens + antibodies), Skin, Tissues (Biology), Compatibility, Blood groups, Sodium compounds, Citrates, Cytoplasm, Parenteral infusions, In vivo analysis, In vitro analysis, Histology, Tissue culture, Effectiveness.

In an attempt to induce facilitation of skin allograft survival in man, 57 skin allografts were applied to recipients selected on the basis of leucocyte group compatibility and pretreated with transplantation antigen preparations obtained from the pros-

pective graft donors. Transplantation antigen preparations obtained after suspension of donor leucocytes in sodium citrate solution resulted in a mean test graft survival time of 13.2 days (8-18 day range). Citrate-free preparations were associated with a mean test graft survival time of 15.5 days (11-23 day range). These data suggest that exposure of cytoplasmic fractions of leucocytes to sodium citrate may abrogate the activity of such fractions as transplantation antigens. In one instance, however, pretreatment of a healthy recipient with citrated antigens was associated with a test graft survival time of 82 days. These observations suggest that the experimental approach upon which the present program is based may be deserving of further exploration, with particular reference to the development of more sensitive methods for the assessment of donor-recipient compatibility, and to the isolation of soluble preparations of transplantation antigens suitable for intravenous use. (Author)
PB-175 596 HC$3.00 MF$0.65

TRANSPLANTATION IMMUNOLOGY.
Semiannual progress rept. 1 Sep 66-1 Mar 67,
Leiden Rijksuniversiteit (Netherlands).
J. J. van Rood.1 Mar 67, 16p
Contract PH-43-65-992
This report consists of pages 37-52. Order as PB-175 592.

Descriptors: (*Transplantation, *Immunology), (*Leukocytes, Antigens + antibodies), Blood groups, Kidneys, Compatibility, Tissues (Biology), Purification, Electrophoresis, Skin, Chimpanzees, Immunity, Netherlands.

Of the 1943 sera screened, 334 contained leukocyte antibodies. Of these 45 appeared to be potentially useful as typing reagents in the EDTA agglutination test. Five chimpanzees produced anti-4a, anti-4b, and anti-7c after immunization. By testing sera with leukocyte antibodies against the panel, the following specificities were found: anti-4b, anti-5b, anti-6a, anti-6b, anti-7b, anti-7c, anti-7d and anti-8a. A total of 4210 ml. of category A (type 1) serum was made available for the collaborative program. No 'new' antigens have been found. Work on the haemagglutination technique using the auto analyser was continued. Work on the Cr51 release method after Sanderson was started. 99 donors and recipients of a kidney allograft were analyzed for their leukocyte groups. The results indicate that the leukocyte groups are of prime importance in early graft rejection. They also appear to be of importance in late rejection.
PB-175 597 HC$3.00 MF$0.65

CZECHOSLOVAK BIO-MEDICAL SERIALS: THEIR IDENTIFICATION AND AN ANALYSIS OF THEIR CONTENTS,
George Washington Univ., Washington, D. C. Biological Sciences Communication Project.
Olga Lendvayova. Jun 67, 74p BSCP-26-67

Descriptors: (*Medical research, *Czechoslovakia), (*Periodicals, Medical research), Subject indexing, Abstracting, Medicine, Information retrieval.

Contents: List of Czechoslovak bio-medical serials; Birth and growth rate; Ceased and unidentified as 'ceased' or 'current' serials; Frequency of issue; Type of publisher; Language of publication; Subject content; Content characteristics; Indexing and abstracting services.
PB-175 606 HC$3.00 MF$0.65

6F. Environmental Biology

ECOLOGY OF DENGUE AND OTHER ARBOVIRUSES OF MALAYSIA.
Progress rept. 1 May 66-1 May 67,
California Univ San Francisco George Williams Hooper Foundation
J. Ralph Andy. 1 Jun 67, 66p
Contract DA-49-193-MD-2931

Descriptors: (*Dengue, Ecology), (*Arboviruses, Ecology), Southeast Asia, Diseases, Infections, Culicidae, Serodiagnosis, Humans, Monkeys, Bats, Aedes, Japanese B encephalitis virus, Chikungunya virus, Epidemiology, Jungles, Rural areas, Ticks, Disease vectors, Collecting methods, Malaya.
Identifiers: Hemorrhagic fever.

The program objectives are to determine the roles that arboviruses play in producing infection and/or disease in man, with special reference to their ecology and the clarification of the non-urban cycles of dengue. The survey investigated a great variety of areas of differing ecology throughout Malaysia. Improved and intensified methods of collection allowed sampling of great numbers of mosquitoes for virus isolation. Predominant species, species composition and habits of mosquitoes in various areas were elucidated. Extensive collection of animals and human sera provided information on the incidence and distribution of arbovirus infection in man and animals, while the diagnostic service provided routine surveillance of arbovirus disease. Additional serological evidence strongly supporting a jungle cycle for dengue was obtained in wild monkeys and forest-dwelling aborigines, while no evidence was found to demonstrate significant involvement of any other animals. Bats showed evidence of group B infection, but this is probably not due to dengue virus. The discovery of Zika virus, previously known in Africa only, in Aedes aegypti and serological evidence of Zika infection in man and wild monkeys is significant. A new arbovirus, Seletar, is described and a large number of unidentified virus isolates from mosquitoes, ticks, and sentinel animals are being investigated. A serological survey of residents of Djakarta, Indonesia, the first to be done, revealed the occurrence of dengue and Japanese encephalitis and possibly chikungunya infection. (Author)
AD-655 288 HC$3.00 MF$0.65

DUST EXPOSURE IN ARMORED VEHICLES.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 5E.
AD-655 574 HC$3.00 MF$0.65

HIBERNATION AND PREFERENTIALLY CHOSEN ENVIRONMENTAL TEMPERATURES,
Colorado State Univ Fort Collins
For primary bibliographic entry see Field 6P.
AD-655 588 Not available from CFSTI.

EQUIPMENT AND TECHNIQUES FOR APPLYING HERBICIDES TO VEGETATION IN PUERTO RICO AND TEXAS. PART II. AGRICULTURAL ENGINEERING STUDIES - TEXAS.
Annual progress rept. 1 Apr 65-31 Mar 66.
Agricultural Research Service Washington D C
1 Apr 66, 95p
ARPA Order-424
Report on proj. Brush Defoliation and Control Studies. Prepared in cooperation with Texas Agricultural Experimental Station.

Descriptors: (*Plants (Botany), *Herbicides), (*Trees, Texas), Puerto Rico, Anticrop agents, Pesticides, Rural areas, Agriculture, Environment, Effectiveness, Spray tanks.

Research is designed to discover and evaluate new herbicides and principles for killing trees, brush and other vegetation, develop methods of evaluating herbicides on different species of woody vegetation, develop methods and principles for improved application techniques, and to determine the effects of environment on the behavior and effectiveness of promising herbicides.
AD-655 629 HC$3.00 MF$0.65

6H. Food

RADIOISOTOPES IN RADIATION PROCESSED FOODS.
Final rept.,
Vanderbilt Univ., Nashville, Tenn. School of Medicine.
George R. Meneely. Apr 63, 44p

Descriptors: (*Irradiated foods, Radioactive isotopes), Radiation effects, Pork, Beef, Chickens, Tracer studies, Cobalt, Gamma rays.

The purpose of this project was to determine if high energy irradiation of food for preservation induced any increase in radioactivity in the irradiated food and, if any increase were detected, to identify the nuclides produced insofar as possible. The basic approach was to use large samples, sensitive low level detection methods, long counting times and appropriate statistical analysis. When available, established techniques were employed, but many new techniques and procedures were developed. (Author)
AD-424 425 HC$3.00

IRRIGATION AS A FACTOR IN THE ECONOMIC DEVELOPMENT OF THAILAND,
Special Operations Research Office, Washington, D. C. Counterinsurgency Information Analysis Center.
For primary bibliographic entry see Field 8H.
AD-464 900 HC$3.00

HYGROSCOPIC EQUILIBRIUM AND TEXTURE OF FREEZE-DRIED FOODS.
Technical rept. 1 Aug 65-31 Jul 66,
Army Natick Labs Mass Food Lab
John G. Kapsalis. Jun 67, 185p Rept no. FL-56
USA-NLABS-TR-67-87-FL

Descriptors: (*Dehydrated foods, Physical properties), (*Freeze drying, Dehydrated foods), Moisture, Acceptability, Storage, Beef, Sorption, Rheology, Chemical properties.

Improved methodology for the objective evaluation of food texture was applied to the measurement of the textural parameters of special freeze-dried foods which were storage-equilibrated under different relative humidity conditions. The foods included pre-cooked freeze-dried beef, laminated freeze-dried products in the form of bite-size sandwiches, and compressed freeze-dried cubes, all of which were designed for consumption without prior rehydration. The results showed that increasing relative humidity from zero to 66% caused an increase in hardness and cohesiveness, and, in certain foods, a decrease in brittleness (crushability index). This was more pronounced at equilibrium points above the B.E.T. value for a monomolecular layer of water. Plots of physico-chemical parameters of water vapor sorption versus rheological properties at different points of the moisture sorption isotherm were examined. The selection of certain 'target' relative humidity values to minimize undesirable changes upon storage, and promising avenues for continued work on the textural quality and acceptability of special freeze-dried foods are discussed. (Author)
AD-655 488

PLANT REQUIREMENTS TO SET UP AND OPERATE SMALL BREAD BAKERIES.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 523 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF CANDY AND CONFECTIONERY.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 526 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR PROCESSING OF DAIRY PRODUCTS.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 527 HC$3.00 MF$0.65

FOOD PROCESSING FEASIBILITY STUDY.
Agency for International Development, Washington, D. C. Communications Resources Div.
May 61, 71p
Prepared in cooperation with Fehmerling Associates, Bridgeton, N. J.

Descriptors: (*Food, Processing), Feasibility studies, Industrial plants, Industrial equipment, Management planning, Costs, Specifications, Fruits, Vegetables.

The publication describes a proposed food processing plant for the processing of tomatoes, papayas, mangos, guavas, and pear puree. The necessary equipment and operations are briefly outlined, together with a plant layout. Two chapters outline the desired information to be compiled in the country of the proposed plant and at the source of equipment and supplies. A complete feasibility study is given in detail. Names and addresses of manufacturers of food processing equipment and supplies are listed. The manufacturing of various food products is illustrated by outlining the equipment, operations, and layout of five different plants that cover the range of commonly processed foods. In summary, the proposed food processing plant is estimated to cost $687,199.24 to produce products that would sell for $808,469.69. The estimated capital required for the first year totals $591,622.90. (Author)
PB-175 533 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF FRUIT AND VEGETABLE JUICES.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 542 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A SEAFOOD PROCESSING PLANT.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 545 HC$3.00 MF$0.65

6J. Industrial (Occupational) Medicine

SAFETY PROCEDURES FOR HIGH ENERGY FUELS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 13L.
AD-655 423 HC$3.00 MF$0.65

6K. Life Support

SOUND TRANSMISSION IN HELIUM AND VARIOUS GASES AT LOW PRESSURES.
School of Aerospace Medicine, Brooks AFB, Tex.
For primary bibliographic entry see Field 20A.
AD-447 980 HC$3.00

SUBCRITICAL LIQUID OXYGEN STORAGE AND SUPPLY SYSTEM FOR USE IN WEIGHTLESS ENVIRONMENTS.
Bendix Corp Davenport Iowa Pioneer-Central Div
For primary bibliographic entry see Field 22B.
AD-655 359 HC$3.00 MF$0.65

PHYSIOLOGICAL PRINCIPLES OF A SOJOURN OF A HUMAN IN CONDITIONS OF RAISED PRESSURE OF THE GASEOUS MEDIUM,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 6S.
AD-655 360 HC$3.00 MF$0.65

INVESTIGATION OF INTERFEROMETRY FOR THE ANALYSIS OF ENCLOSED HABITABLE ATMOSPHERES.
Final rept. Dec 65-Dec 66,
Block Engineering Inc Cambridge Mass
Richard N. Briskman, and Jacob M. Weinberg.
Feb 67, 201p Rept no. 8360
AMRL-TR-66-236
Contract AF 33 (615)-3374

Descriptors: (*Controlled atmospheres, Gas analysis), (*Gas analysis, *Interferometers), (*Infrared spectroscopy, Controlled atmospheres), Contamination, Spectrometers, Feasibility studies, Impurities, Microanalysis, Instrumentation.

To develop a small and highly sensitive optical spectrometer for providing repeatable qualitative and quantitative analysis of contaminant gases in enclosed habitable atmospheres, a feasibility study and measurements program was conducted. An infrared interferometer spectrometer was employed in conjunction with a gas absorption cell for trace gas analysis. During the program, spectra were taken of 43 compounds, 10 binary, 10 trinary, 5 five-order, and 1 fifteen-order mixture. Typical minimum detectable concentrations range from 1 to 40 mg/1. The results of this program have defined a system that will satisfy the criteria for a prototype flight instrument. (Author)
AD-655 396 HC$3.00 MF$0.65

NDRC INFRA-RED GAS ANALYZER FOR CARBON MONOXIDE.
Final rept.
Army Medical Research Lab Fort Knox Ky
18 May 45, 12p

Descriptors: (*Carbon monoxide, Gas analysis), (*Gas analysis, *Infrared spectroscopy), Tanks (Combat vehicles), Poisonous gases, Gas detectors, Instrumentation, Operation, Performance (Engineering).

Results are given of work undertaken to describe the performance characteristics and usefulness of the NDRC Infrared Gas Analyzer, particularly in the study of gun fumes in tanks.
AD-655 578 HC$3.00 MF$0.65

6L. Medical and Hospital Equipment

FUNCTIONAL AREA DESCRIPTION MEDICAL SUPPLY ANNEX C, FOR THE STUDY OF A METHOD FOR INTEGRATION OF MEDICAL ACCOUNTING, REPORTING, SUPPLY, AND REGULATING OF THE ARMY IN THE FIELD INTO THE ADSAF PROGRAM.
Urs Corp Sierra Vista Ariz Arizona Systems Center
For primary bibliographic entry see Field 6E.
AD-655 513 HC$3.00 MF$0.65

BIOMEDICAL APPLICATIONS OF NASA SCIENCE AND TECHNOLOGY FINAL REPORT, 15 JUN. 1966 - 14 JUN. 1967.
Research Triangle Inst., Durham, N. C. Solid State Lab.
J. N. Brown, Jr.. 14 Jun 67, 44p NASA-CR-85603, EU-279
Contract NSR-34-004-035

Descriptors: *Aerospace medicine, *Information retrieval, *Medical progress, *Nasa program, Aerospace, Information, Literature, Medical, Medicine, Progress, Research, Retrieval, Science, Technology.

For abstract, see STAR 05 17.
N67-31399 HC$3.00 MF$0.65

6M. Microbiology

COCCIDIOIDIN SENSITIVITY IN GUINEA PIGS IMMUNIZED WITH KILLED ARTHROSPORES,
Army Biological Labs Frederick Md
For primary bibliographic entry see Field 6E.
AD-655 222 Not available from CFSTI.

MICROBIAL-METAL CORROSION - LITERATURE REPORT.
Final technical rept.,
Army Weapons Command Rock Island Ill Research and Engineering Div
Van Y. S. Hong. Feb 67, 33p
RIA-67-534

Descriptors: (*Microorganisms, Life span), (*Armed forces research, *Corrosion inhibition), Metals, Alloys, Corrosion, Fungi, Algae, Distribution, Environment, Bibliographies, Deterioration, Army equipment, Industrial equipment.

The importance of microorganisms in the corrosion process was illustrated as related to their broad distribution in nature and their longevity of existence on earth. A limited literature survey was made in the five areas of Microbial Corrosion. These areas are: historical background, mechanisms of microbial corrosion, microorganisms and the metals and alloys they attack, preventive measures to counteract this corrosion, and examples of microbial corrosion in military equipment. A brief discussion of each area was made, and also a future research program was suggested in resolving some of the problems found in these areas.
AD-655 274 HC$3.00 MF$0.65

ECOLOGY OF DENGUE AND OTHER ARBOVIRUSES OF MALAYSIA.
California Univ San Francisco George Williams Hooper Foundation
For primary bibliographic entry see Field 6F.
AD-655 288 HC$3.00 MF$0.65

EFFECTS OF HELIUM GROUP GASES AND NITROUS OXIDE ON HeLa CELLS,
Union Carbide Corp Tonawanda N Y Linde Div
J. H. Bruemmer, B. Blular Physiology v69 n3 p385-92 Jun 1967.

Descriptors: (*Tissue culture cells, *Helium group gases), Antimetabolites, Barometric pressure, Xenon, Tissue culture, Growth, Inhibition, Lipids, Solubility, Cytology.

The helium group gases and nitrous oxide at superatmospheric pressures depress multiplication of HeLa cells in monolayer cultures. The effectiveness of these gases in eliciting the pressure-dependent response follows the order N_2O, Xe > Kr > Ar >> Ne and He. The response correlates with lipid solubility of the gases. Depression of

growth by 4.2 atm Xe is reversible after exposure for one and two days. Cultures exposed to 7.2 atm Xe show irreversible damage including cytoplasmic vacuolization. Cell attachment is strongly inhibited by Xe; 36% of the cell inoculum were not attached after 24 hours. Affinity for hydrophobic sites in the cell is suggested as determining the order of effectiveness of the gases in evoking the response. (Author)
AD-655 475 Not available from CFSTI.

NATURAL AND ARTIFICIAL ADENOVIRUS TYPE 4 INFECTION KINETICS AND SERORESPONSE IN NAVAL RECRUITS,
Naval Medical Research Unit No 4 Great Lakes Ill
M. J. Rosenbaum, P. DeBerry, E. J. Sullivan, and E. A. Edwards. 1967, 4p Rept no. RU-67.10 NAVMED-MF-022.03.07-4014
Availability: Published in Bacteriological Proceedings 1p 1967.

Descriptors: (*Respiratory diseases, *Vaccines), (*Adenoviruses, Vaccines), Immunity, Attenuation, Infections, Serodiagnosis.

Immunization with infectious adenovirus type 4 recently was shown to be an effective method for the prevention of acute respiratory disease. In conjunction with vaccine field trials in naval recruits, intensive laboratory studies were made on the infectious nature of the vaccine virus as well as naturally occurring adenovirus type 4. Although stable genetic markers to segregate the respective viruses have not been demonstrated, qualitative differences were observed. Vaccine virus shows affinity for the enteric tract, with little indication of spread to the oropharyngeal cavity, and diminished ability to elicit complement-fixing antibody, although neutralizing antibody response was excellent. These alterations appear to be due to attenuation of the virulence traits of the vaccine virus. These changes are of practical value in the determination of specific protective effect of such live vaccines in the presence of natural challenge. (Author)
AD-655 591 Not available from CFSTI.

POTENTIATION OF ANTIBACTERIALS AGAINST SULFADIAZINE-RESISTANT MENINGOCOCCI.
Naval Medical Research Unit No 4 Great Lakes Ill
For primary bibliographic entry see Field 6O.
AD-655 592 Not available from CFSTI.

SOME CHARACTERISTICS OF NEISSERIA L FORMS,
Naval Medical Research Unit No 4 Great Lakes Ill
D. W. Beno, and Y. E. Crawford. 1967, 4p Rept no. RU-67-11
Availability: Published in Bacteriological Proceedings p1 1967.

Descriptors: (*Neisseria meningitidis, Growth), Culture media, Immune serums, Enzymes, Microbiology.

A total of 78 Neisseria meningitidis carrier strains have been induced into L forms. Four N. meningitidis strains isolated from actual infections developed L colonies within 48 hr. Neisseria L forms grew on isotonic PPLO agar containing thallium acetate, although the parent cocci were totally inhibited. No growth in broth was observed in the absence of agar. However, two strains multiplied in broth containing as little as 0.035% agar. Gram-negative cocci reappreared quickly in the peripheral areas of L colonies planted on penicillin-free medium in 57 of 58 Neisseria strains tested. One became a stable L form. Neither agglutination by grouping antisera nor oxidase reactivity were seen until two to six transfers of reverted cocci were made on bacterial media. Under appropriate conditions, Neisseria species can be induced into L colonies having characteristics similar to other bacterial L forms. (Author)
AD-655 593 Not available from CFSTI.

GENETIC STUDIES OF PIGMENTATION OF STAPHYLOCOCCUS AUREUS,
Fort Detrick Frederick Md
Robert A. Altenbern. 20 Jun 66, 8p
Availability: Published in Canadian Journal of Microbiology v13 p389-95 1967.

Descriptors: (*Staphylococcus aureus, Organic pigments), Genetics, Peptide hydrolases, Mutations, Chromosomes, Growth.

Exposure of cells of several strains of Staphylococcus aureus to 50 to 100 micrograms of N-methyl-N'-nitro-N-nitrosoguanidine for 30 to 60 minutes induced large numbers of mutants with pigment content different from that of the parent. By determination of the amount of pigment as related to the optical density of the cells, four to seven classes of pigmentation mutants could be defined. Mutants with pigment content differing from that of the parent could readily be mutated to other pigmentation states and are thus probable point mutations. In contrast, completely white mutants could not be induced by the mutagen to any degree of pigmentation and possibly represent minor deletions or cumulative single-site mutations in the chromosome. Growth of parent strains in media containing acridine dyes occasionally produced a low frequency (0.01%) of white mutants. Mutants differing in pigment content from that of the parent were unable to produce coagulase during growth, although the parent cultures elaborated considerable coagulase under identical conditions. (Author)
AD-655 654 Not available from CFSTI.

INDUCIBLE LYSIS IN CLOSTRIDIUM TETANI,
Fort Detrick Frederick Md
Lawrence M. Prescott, and Robert A. Altenbern. 15 Dec 66, 8p
Availability: Published in Journal of Bacteriology v93 n4 p1220-6 Apr 1967.

Descriptors: (*Clostridium tetani, Degradation), Bacteriophages, Desoxyribonucleic acids, Ribonucleic acids, Biosynthesis, Inhibition, Toxins + antitoxins, Proteins, Antibiotics.
Identifiers: Mitomycins.

Lysis was induced in seven strains of Clostridium tetani by exposure to mitomycin C. The search for a suitable indicator strain to detect bacteriophage in lysates has, so far, been unsuccessful. Inhibition studies on macromolecular synthesis during induction have shown that deoxyribonucleic acid, ribonucleic acid, and protein syntheses are all involved in the lysis induced by mitomycin C. In experiments comparing toxin and protein content in induced and uninduced cells of C. tetani, the toxin-protein ratio proved to be the same in both systems up to the point of lysis. Several possible hypotheses deduced from these results are discussed. (Author)
AD-655 660 Not available from CFSTI.

AEROSOL STABILITY OF THREE ACUTE RESPIRATORY DISEASE VIRUSES (32054),
Fort Detrick Frederick Md
William S. Miller, and Malcolm S. Artenstein. 14 Dec 66, 6p
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v125 p222-7 1967.

Descriptors: (*Acute respiratory disease virus, Aerosols), (*Adenoviruses, Stability), Parainfluenza virus, Humidity, Tissue culture, Tracer studies.

Aerosols of adenovirus types 4 and 7 and parainfluenza 3 were tested for biological stability as a function of relative humidity. The levels tested were 20%, 50%, and 80%. Both adenoviruses exhibited maximum stability at 80% RH. Parainfluenza on the other hand exhibited a minimum biological decay rate at 20% RH. Studies were carried out with aerosols having mass median diameters of about 2 microns. (Author)
AD-655 669 Not available from CFSTI.

OCCURRENCE OF UREASE IN T STRAINS OF MYCOPLASMA.
Interim rept.,
Naval Medical Field Research Lab Camp Lejeune N C
Maurice C. Shepard, and Carl D. Lunceford. Jul 67, 11p Rept no. Vol. 17/No. 7
Availability: Published in Journal of Bacteriology v93 n5 p1513-20 May 1967.

Descriptors: (*Mycoplasma, Urease), Growth, Urea, Culture media, Growth substances, Proteins, Blood serum, Equines, Antimetabolites, Viability, Identification.

A previously unknown metabolite necessary for growth of T strains of Mycoplasma in artificial culture media has been identified as urea. The source of this metabolite was the mammalian plasma or serum enrichment of the culture medium. Normal horse serum was the most satisfactory native protein enrichment for cultivation of T strains of Mycoplasma, and it is believed that its superior performance in agar and fluid culture media is associated with its relatively high urea content (approx. 40 mg/100 ml). T-strain urease activity was maximal at pH 6.0 plus or minus 0.5. This is also the optimal pH for growth of T strains. Substrate concentrations greater than 1.0% urea were inhibitory to growth and urease activity of T-strain organisms, and optimal urea concentrations in fluid media appeared to lie within the range of 0.008 to 0.01 M. This range of urea concentration permitted maximal growth of T-strain organisms without rapid loss of viability due to excessive ammonia accumulation and rise in pH to lethal levels. T strains of Mycoplasma were cultivated in a serum-free fluid medium containing urea as the only added metabolite and nitrogen source. T strains are the only known human Mycoplasmas which exhibit urease activity, and this biochemical marker can be employed as an aid in the detection and identification of T strains of Mycoplasma (urease color test) and in distinguishing T strains from other members of the human Mycoplasma group. (Author)
AD-655 682 Not available from CFSTI.

PRIMARY VIRUS-CELL INTERACTIONS IN THE IMMUNOFLUORESCENCE ASSAY OF VENEZUELAN EQUINE ENCEPHALOMYELITIS VIRUS,
Fort Detrick Frederick Md
Nicholas Hahon, and Kenneth O. Cooke. 18 Jan 67, 10p
Availability: Published in Journal of Virology v1 n2 p317-26 Apr 1967.

Descriptors: (*Venezuelan equine encephalomyelitis virus, Counting methods), Fluorescence, pH, Temperature, Biological assay, Immune serums, Penetration, Fluorescent antibody techniques.

The conditions under which Venezuelan equine encephalomyelitis (VEE) virus attached to host cells markedly influenced the assay of virus by the fluorescent cell-counting technique. When virus inoculum was centrifuged onto McCoy cell monolayers, approximately 97% of virus was attached to cells within 10 min, in contrast to 34% after stationary incubation at 35 C for 2 hr. Maximal binding of virus occurred only in the presence of 0.1 to 0.15 m NaCl. This salt requirement, added to evidence of pH dependence and temperature independence of VEE virus attachment to cells, indicated that the initial union involved electrostatic forces. Virus penetration, measured by the insensitivity of virus-cell complexes to viral antiserum,

was complete in 30 min at 35 C. The process was temperature-dependent and unaffected by the ionic content of medium. For assay of VEE virus by the fluorescent cell-counting technique, infected cells may be enumerated as early as 12 hr after infection of cell monolayers. The relationship between virus concentration and cell-infecting units was linear; the distribution of fluorescent cells was random. The virus assay was equivalent in sensitivity but more precise and rapid than that of intracerebral inoculation of mice. (Author)
AD-655 696 Not available from CFSTI.

HYDROXYURETHANE: DICHOTOMY OF ACTION IN BACTERIAL AND ANIMAL CELLS.
Columbia Univ New York Dept of Microbiology
For primary bibliographic entry see Field 6A.
AD-655 710 Not available from CFSTI.

PLANETARY QUARANTINE PROGRAM QUARTERLY PROGRESS REPORT, PERIOD ENDING 30 JUN. 1967.
Sandia Corp., Albuquerque, N. Mex.
H. D. Sivinski. Jun 67, 23p NASA-CR-85573, QR-5
NASA ORDER R-09-019-040, NASA ORDER H-13245A

Descriptors: *Lunar surface, *Planetary exploration, *Spacecraft contamination, Contamination, Control, Exploration, Flow, Laminar, Lunar, Microbiology, Microorganism, Model, Planetary, Spacecraft, Sterilization, Surface, Terrestrial, Testing, Ultrasonic.

For abstract, see STAR 05 17.
N67-30747 HC$3.00 MF$0.65

CHARACTERISTIC FLUORESCENCE OF PROTEIN AND NUCLEOLAR ACIDS IN THE CELL CENTERS.
Eidgenossische Technische Hochschule, Zurich (Switzerland).
For primary bibliographic entry see Field 6A.
For abstract, see STAR 05 17.
N67-30764 HC$3.00 MF$0.65

SURVEYOR SPACECRAFT SYSTEM. VOLUME I - FINAL STERILIZATION REPORT, APR. 1961 - MAR. 1963.
Hughes Aircraft Co., Culver City, Calif. Space Systems Div.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 17.
N67-31115 HC$3.00 MF$0.65

MICROBIOLOGICAL FLORA OF HUMAN SUBJECTS UNDER SIMULATED SPACE ENVIRONMENTS FINAL REPORT, AUG. 1965 - OCT. 1966.
Republic Aviation Div., Fairchild Hiller Corp., Farmingdale, N. Y.
P. E. Riely, and D. J. Shorenstein. Oct 66, 226p
NASA-CR-85813, AMRL-TR-66-171
Contract NASA ORDER R-85, AF 33/615/-3255
226 P Refs

Descriptors: *Human body, *Hygiene, *Microbiology, *Space environment, Bacteria, Biology, Body, Chamber, Culture (biol), Diet, Environment, Feces, Human, Medicine, Simulation, Space, Statistical, Test.

For abstract, see STAR 05 17.
N67-31139 HC$3.00 MF$0.65

ACUTE RESPIRATORY INFECTION IN SCHOOL-AGE CHILDREN.
National Communicable Disease Center, Kansas City, Kans.
For primary bibliographic entry see Field 6E.
PB-174 998 HC$3.00 MF$0.65

FEASIBILITY STUDY: RUBELLA VIRUS VACCINE.
Semi-annual contract progress rept. 1 Sep 66-28 Feb 67,
Parke-Davis and Co., Detroit, Mich. Research Div.
Robert G. Brackett. 28 Feb 67, 39p
Contract PH-43-66-92

Descriptors: (*Rubella, Vaccines), Tissue culture, Antigens + antibodies, Agglutinins, Embryonated egg technique, Ultraviolet radiation, Attenuation, Effectiveness, Serodiagnosis.

The attenuated strain of rubella virus, was serially passed 14 times in AGMK cells and the markers of attenuation were verified. Rubella hemagglutinin and complement fixing antigen were produced in good titers in BHK-21 cells in sufficient quantities for serological testing. Twenty-nine liters of M-33 strain rubella were inactivated by combinations of ultraviolet irradiation and beta-propiolactone to produce six vaccines. Available data indicate these six conditions of inactivation inactivated the virus. The vaccines were antigen potency tested in guinea pigs and rats and will be tested in monkeys. No results are available from the antigen potency tests. The hemagglutination inhibition test is being used as our primary assay for rubella antibody. The HI test appears to be 16 to 128-fold more sensitive in detecting rubella antibody than the serum neutralization tests. The specificity of the HI procedure is assured when animal sera are used because of the low or negative non-specific HI titers. Guinea pigs and marmosets were shown to become infected with rubella by isolation of the virus from the lungs or sera of these animals 7 to 14 days after inoculation.
PB-175 503 HC$3.00 MF$0.65

ARBOVIRUS REAGENTS PRODUCTION, FOUR REPORTS.
Repts. for 1 Sep 66-1 Mar 67,
National Inst. of Allergy and Infectious Diseases, Behtesda, Md.
M. A. Bucca, P. H. Coleman, W. G. Downs, and H. A. Wenner. 1967, 32p
For descriptive text on each study, see PB-175 572 thru PB-175 575.

Descriptors: (*Arboviruses, Immune serums), (*Immune serums, Production).

This selection of four semiannual progress reports covers part of the NIAID program for production of research reference reagents. The contracts are listed in supplementary note. Two of the reports summarize recent production of Bwamba viral and Colorado Tick Fever reagents. A third report describes the testing of group C and group Guama ascitic fluids with 71 arboviruses. The fourth report gives test results on a re-formed agent pool of Turlock virus. Treatment of immune ascitic fluids and sera with beta-propiolactone did not affect antibody titer; it seemed useful in the elimination of low-level contamination of such agents with adventitious viruses. (Author)
PB-175 571 HC$3.00 MF$0.65

PRODUCTION OF COLORADO TICK FEVER REAGENTS.
Semiannual progress rept. 1 Oct-31 Dec 66,
National Communicable Disease Center, Kansas City, Kans.
Matthew A. Bucca. 30 Jan 67, 11p
Contract PH-3906037
This report consists of pages 2-12. Order as PB-175 571.

Descriptors: (*Colorado tick virus, Immune serums), (*Immune serums, Production), Volumetric analysis, In vivo analysis, Purification, Ascites, Antigens + antibodies, Viability, Preparation, Mice, Brain, Guinea pigs.

Approximately 2.1 liters of certified seed virus (CSV) reagent were prepared as a 10% suspension in 4% bovalbumin fraction V phosphate buffered saline. The CSV was authenticated as CTF by Dr. C. Eklund, Rocky Mountain Laboratories, NIH. The reagent titered approximately 10 to the 7th power LD50/gm of brain when titrated intracerebrally in suckling mice. The product is free of detectable bacterial, fungal, and mycoplasmal contaminants. Murine virus serological studies of the animals used in producing the CSV and of guinea pigs inoculated with the CSV were completed. Further identity, and purity tests are in progress. Approximately 7 liters of CTF hyperimmune mouse ascitic fluids (MAF), 700 ml of control MAF, 40 ml of CTF mouse hyperimmune serum, and 11 ml of control serum were prepared. The control serum is bacterially contaminated; all other products are sterile. Major subpools of hyperimmune serum and MAF titered from 1:128 to 1:256 by LBCF with homologous antigen. Control reagents did not react in the LBCF at a 1:8 dilution. Additional studies in progress include further identity, purity, and potency testing. (Author)
PB-175 572 HC$3.00 MF$0.65

PRODUCTION OF BWANBA VIRAL REAGENTS.
Semiannual progress rept. 1 Oct 66-1 Jan 67,
National Communicable Disease Center, Kansas City, Kans.
Matthew A. Bucca. 30 Jan 67, 3p
Contract PH-3905-5
This report consists of pages 13-15. Order as PB-175 571.

Descriptors: (*Arboviruses, Immune serums), (*Immune serums, Production), Ascites, In vivo analysis, Brain, Mice, Volumetric analysis.
Identifiers: Bwamba virus.

Viral titers were performed in duplicate by inoculating 2- to 4-day-old mice intracerebrally with 0.02 ml of ten-fold dilutions of the seed virus; six mice per dilution were used. The observation period was 2 weeks.
PB-175 573 HC$3.00 MF$0.65

PRODUCTION, STANDARDIZATION AND PACKAGING OF SEED VIRUSES AND 'MONOTYPIC' MOUSE ASCITES FLUID AND SERUM ANTIBODIES FOR 3 ARBOVIRUSES.
Semiannual progress rept. 1 Sep 66-1 Mar 67,
Kansas Univ., Kansas City, Medical Center.
Herbert A. Wenner. 1 Mar 67, 13p
Contract PH-43-64-1155
This report consists of pages 16-28. Order as PB-175 571.

Descriptors: (*Arboviruses, Immune serums), (*Immune serums, Production), Ascites, Mice, Viability, Purification, Safety, Antigens + antibodies, Volumetric analysis, Biological contamination, Standardization, Packaging.
Identifiers: Turlock virus, California virus, Sicilian sandfly virus, Propiolactone.

The re-formed agent pool of Turlock virus deemed type-specific from the results of the tests and found free of adventitious microorganisms and several murine viruses was used to prepare 15 subpools (total 6,700 ml) of immune ascitic fluid and 6 subpools (total 490 ml) of immune serum in mice. All ascitic fluid and serum subpools were tested for homologous and heterologous (California and SSF) titers and found type-specific; they are free of bacteria, fungi and PPLO. Two miniature pools representing proportional samples of immune ascitic fluid subpools and of immune serum subpools were tested for potency (SDE/LD50 and neutralization index), purity (absence of antibodies to murine viruses) and safety (absence of live virus). Results were satisfactory. Treatment of immune ascitic fluids and sera with beta-propiolactone did not affect antibody titer; it seems useful in the elimina-

tion of low-level contamination of such reagents with adventitious viruses. (Author)
PB-175 574 HC$3.00 MF$0.65

PRODUCTION OF ARBOVIRUS GROUPING ASCITIC FLUIDS.
Semiannual progress rept. 1 Sep 66-1 Mar 67,
Yale Univ., New Haven, Conn. Dept. of Epidemiology and Public Health.
Wilbur G. Downs. 1 Mar 67, 4p
Contract PH-43-66-551
This report consists of pages 29-32. Order as PB-175 571.

Descriptors: (*Arboviruses, *Serodiagnosis), (*Ascites, Antigen-antibody reactions), Body fluids, Production, Classification, Mice, Brain.
Identifiers: Complement-fixation tests.

CF testing of the group C and group Guama ascitic fluids with 71 arboviruses showed a 1:4 reaction of the group Guama fluid with Capim antigen. No other unexpected reactions were noted. The group C ascitic fluid reacted in the 1:4, and at times in the 1:8 dilution, with normal mouse brain. Filtration of ascitic fluids is in progress. Production of five new grouping ascitic fluids was initiated. (Author)
PB-175 575 HC$3.00 MF$0.65

PREPARATION OF PARAMYXOVIRUS REAGENTS.
Repts. 1 Sep 66-1 Mar 67,
National Inst. of Allergy and Infectious Diseases, Bethesda, Md.
William B. Beardmore, and James K. Noel. 1 Mar 67, 35p
For descriptive text on each study, see PB-175 577 thru PB-175 578.

Descriptors: (*Myxoviruses, Immune serums), (*Immune serums, Production), Antigens + antibodies, Preparation.

The two reports, from the contracts listed in the supplementary note, comprise part of the NIAID program for the production of reagents: (1) Parke, Davis and Co. has prepared and tested all five of the following bulk agent pools and buld antiserum pools: A/WS/33, B/Singapore/3/64, A/Equine-2/Miami/1/63, A2/Taiwan/1/64, A/Equine-1/Prague/56. Further tests for stability are in progress. Work is almost completed on the lyophilization and sealing of antiserum pools to there viruses. Composition, sterility, titers, and other data are presented in tables. (2) Flow Laboratories, Inc. has prepared and tested myxovirus and related virus antigens and antisera of reagent grade quality. Progress is reported for the following materials: Parainfluenza type 2 (SV5 and Greer strains), 3, 4A and +B, Respiratory Syncytial (Long and 18537 strains), Measles (Edmonston). The Parainfluenza 2 and RS reagents are furthest along, and summaries of their passages in cultures are presented. (Author)
PB-175 576 HC$3.00 MF$0.65

PREPARATION OF ANTIGENS AND ANTISERA FOR INFLUENZA VIRUS TYPES.
Semiannual progress rept. 1 Sep 66-1 Mar 67,
Parke, Davis and Co., Detroit, Mich.
William B. Beardmore. 1 Mar 67, 21p
Contract PH-43-62-841
This report consistes of pages 2-22. Order as PB-175 576.

Descriptors: (*Influenza virus, Immune serums), (*Immune serums, Production), Antigens + antibodies, Preparation, Packaging, Freeze drying, Stability, Volumetric analysis, Purification, Tables.
Identifiers: A/WS/33, B/Singapore/3/64, A/Equine-2/Miami/1/63, A2/Taiwan/1/64, A/Equine-1/Prague/56.

The preparation and testing of all five of the following influenza bulk Agent Pools and bulk Antiserum Pools has been completed satisfactorily: A/WS/33; B/Singapore/3/64; A/Equine-2/Miami/1/63; A2/Taiwan/1/64; A/Equine-1/Prague/56. Stability tests of lyophilized samples of all five Agent Pools are in progress. All pools will be lyophilized and sealed under vacuum.
PB-175 577 HC$3.00 MF$0.65

PREPARATION OF REFERENCE REAGENTS FOR VARIOUS MYXO AND RELATED VIRUSES.
Semiannual progress rept. 30 Jun-31 Dec 66,
Flow Labs., Inc., Rockville, Md.
James K. Noel. 31 Dec 66, 13p
Contract PH-43-66-953
This report consists of pages 23-35. Order as PB-175 576.

Descriptors: (*Myxoviruses, *Immune serums), (*Immune serums, Production), Tests, Packaging, Antigens + antibodies, Preparation, Tissue culture, Guinea pigs, Parainfluenza virus, Measles viruses.
Identifiers: Respiratory syncytial virus.

The overall objectives of the research were to produce, test, package and deliver various quantities of Myxo and related virus antigens and antisera of reagent grade quality for use in the RRRB repository program.
PB-175 578 HC$3.00 MF$0.65

CHARACTERIZATION AND PRODUCTION OF LIVE RUBELLA VACCINE CANDIDATE STRAINS AND PRODUCTION REAGENTS.
Repts. for 1 Feb 66-1 Mar 67,
National Inst. of Allergy and Infectious Diseases, Bethesda, Md.
Angela E. Auletta, G. A. Castellano, and T. L. Nghiem. 1 Mar 67, 43p
For descriptive text on each study, see PB-175 580 thru PB-175 581.

Descriptors: (*Rubella, Vaccines), (*Vaccines, Production), Antigens + antibodies, Preparation.

The selection comprises two semiannual reports from Microbiological Associates, Bethesda, Md., from the contracts noted in the Supplementary Note. One report covers preparatory work on complement-fixing (CF) antigen, cell lines, and characterization of antigen. The other report gives production data as well as the status of current experiments. (Author)
PB-175 579 HC$3.00 MF$0.65

CHARACTERIZATION AND PROPAGATION OF LIVE RUBELLA VACCINE CANDIDATE STRAINS AND PRODUCTION REAGENTS.
Semiannual progress rept. 1 Sep 66-28 Feb 67,
Microbiological Associates, Inc., Bethesda, Md.
Angela E. Auletta, Theiu L. Nghiem, and Gabriel A. Castellano. 28 Feb 67, 15p
Contract PH-43-65-1004
This report consists of pages 2-16. Order as PB-175 579.

Descriptors: (*Rubella, Antigens + antibodies), Growth, Tissue culture, Vaccines, Viability, Inhibition, Attenuation, Chromatographic analysis, Enzymes, Centrifuge separation, Peptide hydrolases, Trypsin, Ribonuclease, Embryonated egg technique, Monkeys.
Identifiers: Interferans.

Rubella virus CF and HA antigens were produced employing BHK-21 cell cultures. Antigens were chromatographed on Sephadex G-200 columns and treated with proteolytic and nucleic acid destroying enzymes. A single HA antigen and a single CF antigen from untreated and aqueous phase ether treated cell pack material were demonstrated and shown to be sensitive to trypsin but not to DNase and RNase. Adaptation of rubella virus to avian tissue culture systems and embryonated hens' eggs is underway. Temperature adaptation of rubella virus to AGMK tissue culture is proceeding. Antigenicity studies of either treated rubella subunits are being performed in monkeys. Attenuated rubella virus strains were lyophilized, encapsulated and administered orally to monkeys. Interferon characterization of rubella strains under study was completed. A plaque assay system for rubella in RK-13, RK-1 and rabbit cornea cells was developed. (Author)
PB-175 580 HC$3.00 MF$0.65

SEMI-ANNUAL REPORT FOR THE VACCINE DEVELOPMENT BRANCH OF THE NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES.
Rept. for 1 Feb-31 Aug 66,
Microbiological Associates, Inc., Bethesda, Md.
Angela E. Auletta, and Gabriel A. Castellano. 31 Aug 66, 27p
Contract PH-43-65-1004A
This report consists of pages 17-43. Order as PB-175 579.

Descriptors: (*Rubella, Antigens + antibodies), Immune serums, Vaccines, Tissue culture cells, Growth, Tissue culture, Neutralization, Preparation.

The studies are divided into the following general categories: The production of rubella virus complement-fixing (CF) antigen employing various procedures; The development of a line of BHK-21 cells chronically infected with rubella virus; The preparation of high-titered Gilchrist strain rubella virus in primary African green monkey kidney (AGMK) tissue; The growth of rubella virus in cultures of whole rabbit embryo tissue; The adaptation of rubella virus to growth in a number of cell lines at sub-optimal temperatures; Neutralization of the cytopathic effect of rubella virus in BHK-21 cells by use of human antiserum; Preparation of rubella hyperimmune rabbit antiserum; Studies on the characterization of the complement-fixing antigen of rubella virus with special attention to its density and pattern of sedimentation. The Gilchrist strain of rubella virus previously grown in AGMK tissue and adapted to growth in BHK-21 is generally used for the production of complement-fixing antigen and stock preparations of virus seed material. Deviations from this general pattern are noted.
PB-175 581 HC$3.00 MF$0.65

PICORNAVIRUS REAGENTS: PREPARATION AND DEVELOPMENT. FOUR REPORTS.
Repts. for 1 Sep 66-1 Mar 67,
National Inst. of Allergy and Infectious Diseases, Bethesda, Md.
R. W. Brown, E. H. Lennette, J. L. Melnick, and H. A. Wenner. 1 Mar 67, 68p
For descriptive text on each study, see PB-175 588 thru PB-175 591.

Descriptors: (*Enteroviruses, Immune serums), (*Immune serums, Production), Antigens + antibodies, Coxsackie virus, Echo virus, Preparation.
Identifiers: Rhinoviruses, Reoviruses, Picornaviruses.

The collection includes four reports: (1) Carver Research Foundation of Tuskegee Institute reports the production of enterovirus antisera in horses and of rhinovirus antisera in goats. Four coxsackievirus antigens and one rhinovirus antigen were completed. (2) The Viral and Rickettsial Disease Laboratory of California State Department of Health: (a) assayed goat immune serum to coxsackievirus type B3, (b) completed serum breakthrough tests for group A coxsackievirus, (c) examined reovirus types 1, 2, and 3 in SN breakthrough tests against immune rabbit serum, (d) tested immune serum for echovirus type 33, and (e) tested enterovirus candidate strains DN-

19, Toluca-1, and Toluca-4 against immune sera to the currently recognized enteroviruses. (3) Baylor University College of Medicine performed certification tests on three echoviruses and three coxsackieviruses. Assays were completed on two sets of enterovirus horse sera. Tests for homologous antibody were completed on nine series of horse bleedings for group A coxsackieviruses, and for echoviruses. (4) The University of Kansas Medical Center prepared virus stocks for five candidate enteroviruses. Agent pools were also made for coxsackievirus A9 (Grigg) and for echovirus type 12 (Travis 2-85). Stocks were prepared for 27 rhinoviruses.
PB-175 587 HC$3.00 MF$0.65

PRODUCTION OF ENTEROVIRUS ANTISERA.
Semiannual progress rept. 1 Dec 66-1 Mar 67,
Tuskegee Inst., Ala. Carver Research Foundation.
R. W. Brown. 1 Mar 67, 16p
Contract PH-43-62-180
This report consists of pages 2-17. Order as PB-175 587.

Descriptors: (*Enteroviruses, Immune serums), (*Immune serums, Production), Preparation, Coxsackie virus, Echo virus, Equines, Goats, Antigens + antibodies.
Identifiers: Rhinoviruses.

The production of enterovirus antisera in horses and of rhinovirus antisera in goats is reported. Eight other coxsackie virus, one echo virus, and eight rhinovirus antigens are in progress. Data on inoculations, bleedings, and stored and transferred sera are tabulated.
PB-175 588 HC$3.00 MF$0.65

STANDARDIZATION OF PICORNAVIRUS IMMUNE SERA.
Semiannual progress rept. 1 Sep 66-1 Mar 67,
California State Dept. of Public Health, Berkeley. Viral and Rickettsial Disease Lab.
Edwin H. Lennette, and Nathalie J. Schmidt. 1 Mar 67, 9p
Contract PH-43-62-129
This report consists of pages 18-25. Order as PB-175 587.

Descriptors: (*Enteroviruses, Immune serums), (*Immune serums, Standardization), Coxsackie virus, Tissue culture, Volumetric analysis, Neutralization, Goats, Rabbits, Preparation, Echo virus, Poliomyelitis virus, Freeze drying.
Identifiers: Reoviruses, Toluca virus.

Goat immune serum to coxsackievirus type B3 was assayed for homotypic activity in neutralization and hemagglutination-inhibition tests. Titers of all sera were similar in each test system. Serum neutralization breakthrough tests were completed for group A coxsackievirus types 4, 14, 15, 20, 21 and 24, and all of these virus lots were shown to be pure. Coxsackievirus types A4 and A20 had very low titers, and type A17 failed to grow in human amnion cell cultures. Reovirus types 1, 2 and 3 were examined in serum neutralization breakthrough tests against immune rabbit serum. Breakthrough virus from reovirus type 1 was neutralized to high titer by homotypic immune serum, but also to fairly high titer by heterotypic immune sera to reovirus types 2 and 3. Reovirus types 2 and 3 breakthrough virus was neutralized to the expected titer by homotypic immune sera and to markedly lower titers by heterotypic sera. Immune serum for echovirus type 33 was found to have a homotypic titer of 1:8196 against 100 viral TCD50, and immune serum to coxsackievirus type A19 had a low titer of only 1:16 against 3000 LD50 of virus. These sera had no heterotypic neutralizing activity against poliovirus types 1-3, group A coxsackievirus types 7, 9, 16 and 23, group B coxsackievirus types 1-6 or echovirus types 1-33. Enterovirus candidate strains DN-19, Toluca-1 and Toluca-4 were tested against immune sera to the currently-recognized enteroviruses, and DN-19 and Toluca-1 were not neutralized by any of the sera. However, Toluca-4 was shown to be a strain of echovirus type 30. (Author)
PB-175 589 HC$3.00 MF$0.65

PREPARATION OF IMMUNE SERUM TO ENTEROVIRUSES.
Semiannual progress rept. 1 Sep 66-1 Mar 67,
Baylor Univ., Houston, Tex. Coll. of Medicine.
Joseph L. Melmick, and Bettylee Hampil. 1 Mar 67, 21p
Contract PH-43-62-127
This report consists of pages 26-46. Order as PB-175 587.

Descriptors: (*Enteroviruses, Immune serums), (*Immune serums, Production), Echo virus, Coxsackie virus, Stability, Equines, Freeze drying, Antigens + antibodies, Storage, Preparation.

Certification tests for infectivity, identity and purity were completed on 6 ampuled reference seeds (Mg-stabilized seeds of echoviruses 9 (Vispo), 26, 30 and coxsackieviruses A13, A16 and the original fluid seed of coxsackievirus A16). All were satisfactory. Ten remaining seeds for certification are stored frozen (original fluid seeds of coxsackieviruses A3, A20a, and Mg-stabilized seeds of coxsackieviruses A2, A8, A10, A11, A12, A20a and echovirus 21). Nine enterovirus horse sera and the corresponding pre-inoculation sera were pooled, filtered and lyophilized. Liquid and dried samples were tested for homologous antibody. Assays were completed on two sets, echoviruses 16 and 22. Tests are in progress on the remaining samples, echoviruses 14, 24, 25 and coxsackieviruses A1, A5, A6 and A22. Tests for homologous antibody were completed on the bleedings of 9 series of exsanguinated horses. These were coxsackieviruses A2, A3, A8, A10, A13, A16, A20 and echoviruses 21, 30, and 31. Tests are in progress on two sets, coxsackieviruses A3 and A11. Three-liter pools of coxsackieviruses A4, A14, A17, A19, A21, A24 and echovirus 33 prepared as frozen fluids or suspensions were concentrated 10X by the Mg-Al-carbonate method. Horses are under immunization at Tuskegee, and serum samples have been received at regular intervals. In addition, samples have been received from the horses under immunization against coxsackieviruses A15 and A18, prepared earlier. (Author)
PB-175 590 HC$3.00 MF$0.65

PREPARATION AND DEVELOPMENT OF REAGENTS FOR THE PICORNAVIRUSES.
Semiannual progress rept. 1 Sep 66-1 Mar 67,
Kansas Univ., Kansas City. Medical Center.
Herbert A. Wenner. 1 Mar 67, 21p
Contract PH-43-64-529
This report consists of pages 47-67. Order as PB-175 587.

Descriptors: (*Enteroviruses, Immune serums), (*Immune serums, Production), Echo virus, Coxsackie virus, Antigens + antibodies, Goats.
Identifiers: Rhinoviruses, Reoviruses.

Virus stocks were prepared for 5 candidate enteroviruses. Further work with these reagents, particularly serum production, deferred pending recognition of several viruses as specific serotypes. Agent pools were prepared for coxsackievirus A9 (Grigg) and for echovirus type 12 (Travis 2-85). Identity studies indicate only the presence of the type-specific virus. Virus stocks were prepared for 27 coryzaviruses (rhinoviruses). Twenty-five stocks were certified by two laboratories, after which most of the bulk stocks (24 serotypes) were sent to Tuskegee Institute for inoculation into goats in order to obtain type-specific antisera. Samples of sera obtained from goats inoculated with 20 coryzavirus serotypes were returned to the University of Kansas, where early (trial bleeding) and late (final bleeding) antisera were studied for homologous antibody responses. Serum dilution endpoints ranged from 1:8 to 1:4000. Cross-serological studies revealed several minor crosses. Tabular summaries up-date some final studies of simian entero- and reoviruses. (Author)
PB-175 591 HC$3.00 MF$0.65

GROWTH AND PREPARATION OF MYCOPLASMA PNEUMONIAE VACCINES.
Repts. for 15 Nov 66-1 Mar 67,
National Inst. of Allergy and Infectious Diseases, Bethesda, Md.
L. B. Senterfit, and N. L. Somerson. 1 Mar 67, 18p
For descriptive text on each study, see PB-175 599 thru PB-175 600.

Descriptors: (*Mycoplasma, *Vaccines), Pleuropneumonia-like organisms, Growth, Preparation, Immunity, Antigens + antibodies, Serodiagnosis, Epidemiology, Diseases.

Two reports are included in this selection: (1) The St. Louis University School of Medicine study of the antigenicity and immunogenicity of M. pneumoniae vaccines; (2) The Ohio State University Research Foundation study of the influence of cultural conditions and concentration procedures on the antigenicity of M. pneumoniae vaccines. Both studies are in their early phases. (Author)
PB-175 598 HC$3.00 MF$0.65

STUDY OF THE ANTIGENICITY AND IMMUNOGENICITY OF MYCOPLASMA PNEUMONIAE VACCINES.
Interim joint progress rept. 15 Nov 66-15 Apr 67,
Saint Louis Univ., Mo. School of Medicine.
Lawrence B. Senterfit. 15 Apr 67, 17p
Contract PH-43-67-79
This report consists of pages 2-18. Order as PB-175 598.

Descriptors: (*Mycoplasma, *Vaccines), Pleuropneumonia-like organisms, Growth, Preparation, Immunity, Antigens + antibodies, Serodiagnosis, Epidemiology, Diseases.

The development and refinement of methods of measuring antigenicity and immunogenicity of M. pneumoniae vaccines are discussed. The study of the antigens of M. pneumoniae, grown under varying experimental conditions, is reported. Epidemiologic studies by serologic testing are in progress.
PB-175 599 HC$3.00 MF$0.65

THE INFLUENCE OF CULTURAL CONDITIONS AND CONCENTRATION PROCEDURES ON THE ANTIGENICITY OF MYCOPLASMA PNEUMONIAE VACCINES.
Interim joint progress rept. 6 Dec 66-15 Apr 67,
Ohio State Univ. Research Foundation, Columbus.
Norman L. Somerson. 15 Apr 67, 17p
Contract PH-43-67-78
This report consists of pages 2-18. Order as PB-175 598.

Descriptors: (*Mycoplasma, *Vaccines), Pleuropneumonia-like organisms, Growth, Preparation, Immunity, Antigens + antibodies, Serodiagnosis, Epidemiology, Diseases.

Determination was made of the relation of cultural conditions for M. pneumoniae to the antigenicity of the organisms. The concentration of mycoplasmas by various methods and the study of antigenic fractions obtained from these concentrated preparations are reported. Investigation is being made of M. pneumoniae isolates for their genetic stability and antigenic potential for use in vaccines.
PB-175 600 HC$3.00 MF$0.65

6N. Personnel Selection and Maintenance (Medical)

DEVELOPMENT OF A COMBAT BOOT LAST FOR THAI AND VIETNAMESE MILITARY FORCES.
Army Natick Labs Mass Clothing and Organic Materials Div
For primary bibliographic entry see Field 15E.
AD-655 529 HC$3.00 MF$0.65

PRESELECTION TESTS.
Final rept.
Army Medical Research Lab Fort Knox Ky
17 Mar 45, 14p

Descriptors: (*Military personnel, Selection), Tanks (Combat vehicles), Intelligence tests, Visual acuity, Aging (Physiology), Physical fitness, Psychometrics, Military training.

Men were being received at the Armored Replacement Training Center whose qualifications for the most part were not up to standards judged necessary for effective tank operation. This was regarded as a partial explanation of the frequency of vehicle failures, and of the habitual failure of many men to satisfactorily complete the course of training. The qualifications of tank crewmen established for this study were: Age - 30 or under (altenately 25 or under); AGCT - 90 or above (or alternately 80 or above); Height - 5 ft. 3 in. to 5 ft. 11 in. inclusive; Weight - 110 to 185 lbs. inclusive; Physical profile - 2-1-1-1-1-1 or above; Vision - acuity in each eye of at least 20/60; astigmatism in no more than 2 meridians of either eye; normal color vision; no glasses. On the basis of these qualifications, with the age limit at 30, only 17.1% of the 608 men examined were acceptable for training as armored troops. With the age limit placed at 25, as few as 7.8% were acceptable. However, lowering the AGCT standard to 80, while maintaining the age limit at 30, resulted in the acceptability of 24.6% of this increment. Psychologic inadequacy, night vision, recovery from glare, and identification of preferential eye were not tested because of limitations in time and equipment. (Author)
AD-655 573 HC$3.00 MF$0.65

COMPARISON OF TESTS OF PHYSICAL FITNESS,
Army Medical Research Lab Fort Knox Ky
Ludwig W. Eichna, William Bennett Bean, and William F. Ashe. 10 Mar 44, 52p

Descriptors: (*Physical fitness, Tests), Military requirements, Motivation, Endurance, Fatigue (Physiology), Performance tests, Military personnel.

Men tested by four physical fitness tests (Army Ground Forces test, Army Air Forces test, Navy step test, and Harvard Fatigue Laboratory step test) attained differing and variable ratings by the different tests. Not one of these four tests fulfills the requirements of an ideal physical fitness test. The Army Ground Forces test incorporated the largest number of good features.
AD-655 576 HC$3.00 MF$0.65

6O. Pharmacology

RESEARCH AND ANTIRADIATION DRUGS.
Annual progress rept. no. 3, 1 Apr 62-31 Mar 63,
Monsanto Research Corp., Everett, Mass.
Morton H. Gollis. 10 Sep 63, 62p
Contract DA-49-193-MD-2109

Descriptors: (*Radioprotective agents, Analysis), (*Organic compounds, Radioprotective agents), Synthesis, Sulfur compounds, Drugs, Alcohols, Alkylation, Amines, Halides, Sodium, Ammonia, Thiols, Alkenes, Sulfides.
Identifiers: Amination, Thiol ethylation, Cysteamine, Debenzylation, Hydroxylation, Hydrochlorides, Epoxide.

Forty-seven new compounds were synthesized and submitted to the contracting agency for evaluation as potential antiradiation drugs. Also, additional quantities of two compounds previously submitted were resynthesized for further evaluation. The compounds were mainly N-substituted derivatives of 2-aminoethanethiol and included alkylaminoethanethiols, hydroxyalkylaminoethanethiols, aminoalkylaminoethanethiols, and N, N'-bis (2-mercaptoethyl)alkylenediamines. General synthesis routes included (a) thiolethylation of amino compounds with ethylene sulfide; (b) alkylation of amines with benzyl 2-chloroethyl sulfide and amination of halides with 2- (benzylthio)ethylamine, followed by debenzylation; (c) amination of epoxides with 2- (benzylthio)ethylamine, followed by debenzylation; and (d) amination of 1-2-(benzylthio)ethylaziridine with amino compounds, followed by debenzylation. (Author)
AD-419 104 HC$3.00

THE EFFECTS OF ANTI-INFLAMMATORY DRUGS UPON THE CHEMISTRY AND ENZYMOLOGY OF RAT SKIN.
Children's Hospital Washington D C Biochemical Research Lab
For primary bibliographic entry see Field 6A.
AD-655 333 Not available from CFSTI.

INVESTIGATION OF THE EFFECTS OF ACTIVITY AND ENVIRONMENT ON ATABRINE THERAPY.
Final rept.
Army Medical Research Lab Fort Knox Ky
23 Dec 43, 90p

Descriptors: (*Antimalarials, Pharmacology), Statistical analysis, Blood plasma, Dosage, Tropical tests, Excretion, Degradation, Proteins, Cinchona alkaloids, Military medicine.

The purposes of the research were (1) To determine with each of two recommended suppressive regimens administered to troops during active training: (a) the time required to develop equilibrium plasma atabrine levels; (b) the magnitude of the level in relation to dosage and (c) the variability in levels among individuals on the same regimen. (2) To determine the effect of high initial doses in shortening the time required to reach equilibrium levels. (3) To determine the effects of a simulated jungle climate upon the plasma atabrine levels. (4) To study the rate of reduction of plasma atabrine levels after discontinuing administration of the drug. (5) To study the relationship between the plasma atabrine levels obtained with therapeutic doses and those established previously with suppressive regimens. (Author)
AD-655 579 HC$3.00 MF$0.65

POTENTIATION OF ANTIBACTERIALS AGAINST SULFADIAZINE-RESISTANT MENINGOCOCCI.
Final rept.,
Naval Medical Research Unit No 4 Great Lakes Ill
P. F. Frank, H. V. Graham, and C. S. Brooks.
1967, 4p Rept no. RU-67.9
Availability: Published in Bacteriological Proceedings 1p 1967.

Descriptors: (*Sulfadiazine, Resistance (Biological)), (*Neisseria meningitidis, *Antibiotics), Effectiveness, In vitro analysis, Sensitivity, Cinchona alkaloids, Antimalarials, Inhibition, Diseases.
Identifiers: Synergism.

Failure of sulfadiazine prophylaxis to control an outbreak of meningococcal infections at the Naval Training Center, San Diego, Calif., led to the search for other antibacterials to eradicate the carrier state. None of the antibiotics tested showed promise. Sevag reported that various antimalarial drugs, when tested in combination with antibiotics in vitro, suppress emergence of drug-resistant bacteria. In other tests, pyrimethamine in noninhibitory concentrations was able to increase the in vitro sensitivity of sulfadiazine-resistant meningococci to sulfadiazine. In this paper, a comparison of the effects of pyrimethamine, chloroquine, Atabrine, and isonicotinyl hydrazide on the in vitro inhibitory effect of penicillin G, ampicillin, sulfadiazine, sulfasoxazole, and oxytetracycline against sulfadiazine-resistant meningococci is presented. The most effective combination showing a potentiation effect against meningococci was found to be pyrimethamine and sulfadiazine. (Author)
AD-655 592 Not available from CFSTI.

INVESTIGATION INTO THE SITE AND MODE OF ANTIVERTIGO ACTION OF A NEW PHENOTHIAZINE DERIVATIVE FINAL REPORT.
Tulane Univ., New Orleans, La.
P. S. Guth. 1967, 2p NASA-CR-85902
Grant NSG-346

Descriptors: *Cerebellum, *Motion sickness drug, *Thiethylperazine, Brain, Concentration, Dog, Function, Human, Localization, Mode, Nystagmus, Rabbit, Site, Vertigo, Vestibular.

For abstract, see STAR 05 17.
N67-31492 HC$3.00 MF$0.65

TOXICOLOGIC EVALUATION OF ESTRA-4, 9, 11-TRIEN-3-ONE, 17BETA-HYDROXY-17-METHYL- (NSC-92858E).
Research rept.,
Mason Research Inst., Worcester, Mass.
Zareh Hadidian. 19 Jan 67, 11p
Contract PH-43-65-51

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Body fluids, Secretion, Dosage, Hematology, Blood chemistry, Testosterone, Toxic tolerances, Prostate gland, Tables, Steroids, Dogs.

In a study of the toxicity of Estra-4, 9, 11-trien-3-one, 17 beta-hyroxy-17-methyl (NSC-92858E) it was discovered that dogs receiving 0.2 mg/kg daily showed definite evidence of increased lacrimation at the beginning of the fourth week of treatment. To continue the study of this phenomenon, it was decided to repeat the study on two dogs with prostatic fistulas. The reason for using these animals was to look into the possible effect of the compound on glandular secretions other than that of the lacrimal glands. Because the two animals with prostatic fistulas failed to show lacrimation, it was decided to do another experiment to determine the possible role of exogenous testosterone in the failure. Two beagles were given a daily dose of 0.2 mg/kg of NSC-92858E for 32 days: they were then given subcutaneously, while still receiving the same dose of NSC-92858, 5 mg daily of testosterone suspended in sterioid suspending vehicle. Treatment with both compounds was continued for 28 days and then all treatment was stopped. No animal was killed for necropsy. The two dogs with the prostatic fistulas did not lacrimate nor was there any significant effect on the volume or the composition of the prostatic fluid. The preparation of one of the animals (163) was evidently faulty so that the prostatic fluid was contaminated with urine, as surmised from its yellow color and high potassium content (Table 1). It was believed that exogenous testosterone interfered somehow with the action of NSC-92858E to prevent lacrimation; hence the study with the two beagles was undertaken.
PB-174 872 HC$3.00 MF$0.65

TOXICOLOGIC EVALUATION OF 2-2' (9-10-ANTHRYLENEDIMETHYLENE) - BIS - 2 - PSEUDOTHIOUREA DIHYDROCHLORIDE DIHYDRATE (NSC-56054).
Research rept.,
Mason Research Inst., Worcester, Mass.
Zareh Hadidian. 25 May 66, 94p
Contract PH-43-65-51

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Mice, Dogs, Monkeys, Parenteral infusions, Dosage, Toxic tolerances, Eye, Pathology, Blood diseases, Lungs, Edema, Hemorrhage, Blood chemistry, Hematology, Histology, Thiourea.

After preliminary studies had shown that (1) 2-2' (9-10-Anthrylenedimethylene)-bis-2-pseudothiourea dihydrochloride dihydrate (NSC-56054) is not active by the oral route and (2) it is not soluble in any of the commonly used vehicles for intravenous administration, a formulation was devised in 25% dimethyl sulfoxide (DMSO) and 5% glucose which could be used for intravenous toxicity studies if administered with care. This vehicle itself produced no adverse effects in four dogs and two monkeys; but a 2.5 mg/ml solution of the compound in the vehicle caused severe respiratory distress when injected at a normal rate in volumes exceeding 1 ml/kg. Moreover the formulation was found to be incompatible with serum in vitro when mixed in proportions greater than one part in 10. Nevertheless it was possible to study the systems toxic effects of the compound by administering the high dose levels in divided portions an hour or two apart. These effects were, in both the dog and the monkey: leukopenia with pronounced granulocytopenia at the dose level of 60-80 mg/sqm (3.56 mg/kg in the dog; 5.0 mg/kg in the monkey); and leukopenia with pulmonary edema and hemorrhage in various internal organs at higher dose levels. At all dose levels there was some damage to the veins used for injection, which in part at least could be attributed to the vehicle itself. (Author)
PB-174 873 HC$3.00 MF$0.65

TOXICOLOGIC EVALUATION OF ESTRA-1,3,5 (10-TRIEN-17 BETA-ol, 3 METHOXY-17- (TRIFLUOROVINLY)- (NSC-73865E).
Research rept.,
Mason Research Inst., Worcester, Mass.
Zareh Hadidian. 15 Jan 67, 31p
Contract PH-43-65-51

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Dosage, Hematology, Blood chemistry, Toxic tolerances, Dogs, Sex glands, Hemopoietic system, Reproductive system, Biopsy, Blood counts, Histology, Anemias, Pathology, Steroids.

The purpose of this study was to investigate whether certain alarming toxic manifestations in dogs attributed to the compound were reproducible. Dose levels of 0.32 mg/kg and 1.25 mg/kg were chosen for this purpose to be administered orally to two groups of beagles, with two males and two females in each group, for 28 consecutive days. The compound was mixed with lactose and placed in hard gelatin capsules for oral administration, and the study was carried out as requested. No alarming toxic effects developed, although the compound had definite effects on (1) the gonads and the accessory organs and (2) on hemopoiesis. Effects were as follows: (1) Slight to moderate gain in weight; (2) Prostatic metaplasia; (3) Swelling of vulva and of the vagina; (4) Uterine changes; (5) Increase in white cell count. Other effects that may be noted were histologic changes in the liver and the adrenals, and in some instances a tendency to develop anemia. Urine specimens were unremarkable. All effects were reversible. White cell counts were back to normal in the animals held for observation in all cases seven days after the final treatment, and no pathology was observed in the animals necropsied on day 57.
PB-174 874 HC$3.00 MF$0.65

6P. Physiology

PILOT STUDIES OF A SCOTOPIC SENSITIVITY TEST,
Naval Medical Research Lab., New London, Conn.
Gilbert Fooks, Edward J. Sweeney, and Forrest L. Dimmock. 14 Jun 57, 12p 285, Vol. 16/No. 7
NAVMED-NM-23-01-20

Descriptors: (*Vision, Adaptation (Physiology)), (*Night vision, Sensitivity), Psychophysics, Sampling, Photosensitivity (Biological), Test methods.

A new test of night vision sensitivity was devised, that is based on data obtained in a series of experiments reported by this Laboratory. Those findings indicated (1) that sensitivity in the visual field must be sampled in two dimensions; and (2) that size and brightness of the test areas can be used interchangeably. The present preliminary studies were designed to determine (1) whether a sampling procedure would give the same indication of the distribution of sensitivity as the more extended psychophysical techniques; (2) whether reliable differences in individual scotopic sensitivity were indicated; (3) whether multiple stimuli could be presented as a time-saving device; and (4) whether one or two testing sessions would give an adequate score. The results show (1) that the sensitivity scores correlate well with the psychophysical findings; (2) that significant individual differences in scoptopic sensitivity exist; (3) that multiple stimuli do not produce any decrement in the sensitivity scores; and (4) that two testing sessions serve to differentiate individuals adequately. (Author)
AD-159 358 HC$3.00

ABSTRACTS FROM EAST EUROPEAN SCIENTIFIC AND TECHNICAL JOURNALS NO. 143 (BIOLOGY AND MEDICINE SERIES).
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6E.
AD-406 737 HC$3.00

COMPARISON OF MINERAL EXCRETION (CALCIUM AND IODINE) IN ARM AND TOTAL BODY SWEAT,
Army Medical Research and Nutrition Lab., Denver, Colo.
C. Frank Consolazio, Leroy O. Matoush, Richard A. Nelson, Gerhard J. Isaac, and Ronald C. Hughes. 14 Aug 64, 13p Rept. no. 282

Descriptors: (*Perspiration, Minerals), (*Excretion, Minerals), Calcium, Iodine, Respiration, Heat, Body temperature, Arms, Metabolism.

Mineral excretions calculated from arm sweat samples are in fairly good agreement with those calculated from total body sweat samples. Agreement improves if account is taken of the respiratory water loss. However, the studies suggest that total body sweat procedures should be used wherever possible to determine ,mineral excretion because some individuals do not sweat appreciably on the arms. (Author)
AD-447 380 HC$3.00

SOMATIC CORRELATES OF PSYCHOLOGICAL REACTION.
Final rept. 15 Oct 57-30 Jun 64,
Washington School of Psychiatry D C
Donald L. Burnham. 30 Jun 67, 25p
Contract DA-49-007-MD-902

Descriptors: (*Psychophysiology, *Cardiovascular system), Stress (Psychology), Central nervous system, Autonomic nervous system, Physiology, Nervous system, Endocrine glands, Mental disorders, Psychoses, Emotions, Hypnosis, Responses, Conditioned reflex, Cardiovascular diseases, Reaction (Psychology), Psychiatry, Data processing systems.
Identifiers: Psychosomatic disorders, Schizophrenia.

A number of exploratory longitudinal studies were conducted on correlations between cardiovascular reactivity in several parameters and changing psychological states in healthy and patient populations. These studies were expanded to include longitudinal analyses of changes in psychoendocrine patterns in 'normal' human subjects, acute schizophrenic patients and animals. Another extension of these studies included autonomic conditioning in humans and animals in which operant techniques were utilized. Related intracranial stimulation experiments were performed on animals and tentative attempts were made for its utilization in the alleviation of intractible pain in terminal cancer patients. Several technical developments were made in transducers and an automatic multiple channel general purpose Data Processing System for physiological variables was designed and built which is now in operation in related experiments. (Author)
AD-655 287 HC$3.00 MF$0.65

SPATIAL INTERACTION IN HUMAN CONE VISION.
Technical rept.,
California Univ Berkeley School of Optometry
Gerald Westheimer. 21 Oct 66, 17p Rept no. TR-12
Contract Nonr-222 (82)
Availability: Published in J. Physiol. v190 p139-54 1967.

Descriptors: (*Vision, Adaptation (Physiology)), Retina, Space perception, Visual perception, Thresholds (Physiology), Stimulation, Inhibition, Photosensitivity (Biological).

The adaptation state of a uniformly illuminated patch of human cone retina was determined by finding the threshold for a small, brief light spot seen flashing in its centre. When the illuminated patch of the retina is increased in diameter, the adaptation state is first raised, and beyond a critical background diameter, lowered. This is interpreted as a manifestation of excitatory and inhibitory interaction of adaptation stimuli: illumination of retinal regions in the immediate neighbourhood of the area tested acts to raise the adaptation level, and of those further removed acts to lower it. The critical area beyond which adapting light produces inhibition is about 5 min of arc in diameter in the eye's object space for foveal observation. For peripheral cone vision it increases much as the minimum angle of resolution. The inhibiting action of outlying areas is substantially reduced, or perhaps even eliminated, by lowering the background luminance. Surrounding the retinal patch with a pair of juxtaposed narrow concentric black and white rings superimposed on a uniform field, simulating a border, irrespective of diameter, does not influence the threshold of the probing spot. This argues against a possible threshold raising effect of the border of the background. The inhibiting action on a patch of cone retina of a surrounding annulus occurs only when the annulus is seen by the same eye and not when it is seen by the other eye: the site of inhibitory interaction is, therefore, retinal. (Author)
Not available from CFSTI.

RECOVERY OF EVOKED POTENTIALS IN VISUAL SYSTEM FOLLOWING INTENSE STIMULATION,
Texas Univ Austin Dept of Electrical Engineering
A. J. Welch, and Franklin G. Hempel. 1967, 11p
AFOSR-67-1594
Grant AF-AFOSR-766-65
Availability: Published in 1967 SWIEEECO RECORD nF-72 p11-2-1-S Apr 19 1967.

Descriptors: (*Eye, *Flashblindness), (*Cornea, *Retina), (*Adaptation (Physiology), *Vision), Electroencephalography, Electroretinography, Eye pigments, Recovery, Light, Stimulation, Intensity, Recording systems, Signal-to-noise ratio, Sensitivity, Reflection.

The report describes the recovery of ERG and EEG evoked responses from albino and pigmented rabbits following intense light flashes. Recovery times as a function of test stimuli intensity are presented for an adapting flash intensity at the cornea. The results suggest that the orderly recovery of the ERG response following an intense photic stimulus might serve as one useful index of recovery of visual function in the typical flashblinding situation.
AD-655 398 Not available from CFSTI.

COMPUTERIZED VISIBILITY CALCULATIONS MAXIMUM SIGHTING RANGE PROGRAM.
Technical rept.,
Scripps Institution of Oceanography San Diego Calif Visibility Lab
Ivan Harry Barkdoll, III. Jul 67, 126p Rept no. SIO Ref-67-23
Contract NObs-92058

Descriptors: (*Visibility, *Computer programs), (*Vision, *Thresholds (Physiology)), Adaptation (Physiology), Ranges (Distance), Luminescence, Detection, Reflection, Probability, Targets, Environment.

The report describes the development of computer programs for the performance of visibility calculations. The computer programs use input data as to the directional reflectance properties of both object and background to determine the inherent contrast of the object for a particular path of sight. Atmospheric contrast transmittance for the path of sight is calculated from input atmospheric data in the form of path luminance and beam transmittance. The inherent contrast is then multiplied by the contrast transmittance to find the apparent contrast. These calculations are repeated for selected distances from the object to determine that range at which the apparent contrast of the object matches the contrast threshold for the human visual system for the angular subtense of the object as viewed at that distance, and for the adaptation level specified. The vision data used in the calculation is the Tiffany data and represents best visual performance, in that the stimulus duration was long, the observers knew where the object was located, and the observers were allowed to fixate in any manner of their choosing. Therefore, ranges calculated from this vision data are called maximum sighting ranges. The computer program described in this report calculates maximum sighting ranges for 57 paths of sight defining hemispherical volume within which the object can be detected.
AD-655 470 HC$3.00 MF$0.65

EXPERIMENTAL ANALYSIS OF CEREBRAL DOMINANCE IN MAN,
Genoa Univ (Italy)
Gian Franco Rossi, and Guido Rosadini. 1967, 20p
AFOSR-67-1627
Contract AF 61 (052)-901
Availability: Published in Brain Mechanisms Underlying Speech and Language p167-84 1967.

Descriptors: (*Brain, Physiology), Speech, Hands, Barbiturates, Injection (Medicine), Electroencephalography, Emotions, Motor reactions, Experimental design, Arteries, Symposia, Italy.
Identifiers: Consciousness.

The report discusses the contribution of experimental methods to the study of cerebral dominance in man. The two experimental approaches which have been more largely followed and which have been proved capable of giving reliable information are those based upon direct electrical stimulation of the cerebrum and of hemisphere pharmacologic inactivation by injection of a barbiturate into the carotid arteries. The bulk of the results obtained with the first approach are due to Penfield and his associates. Barbiturate intracarotid injection, a method introduced by Wada in 1949, though performed already in several laboratories has given results which are not so well known and so extensively discussed as the other ones. For this reason this report is centered on it. The body of the report is based on results obtained by the application of the method over a period of five years on 126 patients. (Author)
AD-655 486 Not available from CFSTI.

SINGLE UNIT ANALYSIS OF CAT SUPERIOR OLIVE S SEGMENT WITH TONAL STIMULI.
Doctoral thesis,
Army Medical Research Lab Fort Knox Ky
Chiyeko Tsuchitani, and James C. Boudreau. 30 Nov 65, 22p Rept no. USAMRL-734
Availability: Publisbed in J. Neurophysiol. v29 p684-97 1966.

Descriptors: (*Auditory perception, Electrophysiology), Nerve cells, Hearing, Brain, Physiology, Nervous system, Nerve impulses, Cats.

Single unit activity in the S-segment of the superior olivary complex of the cat was recorded from animals under barbiturate anesthesia while tonal stimuli were presented. S-segment units are typically without spontaneous activity and were excited by ipsilateral stimulation. Tuning curves were fairly symmetrical except at high levels of stimulation. A progressive increase in tuning curve band width was observed as characteristic frequency increased. This relationship could be described with a power function. Precise tonotopic organization within the S-segment was found. (Author)
AD-655 565 Not available from CFSTI.

SUBJECTIVE ESTIMATION OF EFFORT, RESERVE, AND ISCHEMIC PAIN.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 5J.
AD-655 568 HC$3.00 MF$0.65

STUDY OF MEN DRINKING BURSOLINE TREATED WATER IN MOIST HEAT.
Final rept.
Army Medical Research Lab Fort Knox Ky
26 May 45, 40p

Descriptors: (*Water, Purification), (*Iodine, Ingestion (Physiology)), Germicides, Military personnel, Sensitivity, Metabolism, Tropical tests, Taste, Acceptability, Excretion.
Identifiers: Bursoline.

Bursoline in quantities of up to 20 tablets per working day was consumed by the subjects without complaint as to taste or appearance of the treated water. There was no evidence of any ill effect produced by drinking Bursoline treated water upon the subjects working in a hot humid environment under the circumstances of this test. The iodine ingested with the treated water was rapidly eliminated by the subjects. Three to five days after stopping Bursoline, plasma and urine iodine had fallen to very low levels. (Author)
AD-655 572 HC$3.00 MF$0.65

CONTRACTILITY OF VENTRICULAR STRIPS AS RELATED TO HIBERNATION AND TEMPERATURE,
Colorado State Univ Fort Collins Dept of Physiology
Frank E. South. 1964, 1p
Research supported in part by Nonr, and NIH.
Availability: Published in Federation Proceedings v23 p311 1964.

Descriptors: (*Hibernation, *Cardiovascular system), (*Heart, Hibernation), Body temperature, Responses, Muscles, Rats, Hamsters.

Hearts of hibernating mammals are capable of functioning at low temperatures. This experiment was designed to attempt a partial ellucidation of this characteristic. Trabecular muscles from the hearts of hibernating and control hamsters and rats were incubated at temperatures ranging from 0.2 to 38C. The preparations were fixed between an adjustable clamp and an isometric level system coupled to an RCA 5734 transducer tube. The apparatus was arranged for simultaneous recording of tension and its first derivative. Isometric twitch tension and rat preparations passed through a maximum between 24 and 31C while those of the hamsters were greatest within a range about 10C lower. While Arrhenius plots of the reciprocals of the half-contraction times shed little light on mechanisms responsible for these differences, it was found that the intervals required to attain the active state 'hump' of Sandow as well as the peak of maximal velocity were correlated with differences in the temperature effects upon tension production. Additional features of the rate curves suggest that the low temperature optima of the hibernator hearts possibly is due to a combination of rapidity of onset and duration of the active state. (Author)
AD-655 587 Not available from CFSTI.

HIBERNATION AND PREFERENTIALLY CHOSEN ENVIRONMENTAL TEMPERATURES,
Colorado State Univ Fort Collins
Mitchel R. Gumma, James N. Allen, and Frank E. South. 1965, 1p
Grants Nonr (G)-0005-64, PHS-GM-09584-04
Availability: Published in Federation Proceedings v24 n2 1p Mar-Apr 1965.

Descriptors: (*Hibernation, Temperature), Hamsters, Rats, Environment, Ecology.

The two questions to which this study addresses itself to are: (1) Do hibernative and non-hibernative mammals prefer different environmental temperatures. (2) Do hibernative mammals prefer the same environmental temperature before and after hibernation. S's were 12 male Golden Syrian Hamsters and 3 male albino rats. A 'T' maze was constructed so that one goal box was held at 8C., the other at 24 or 19C. Both boxes were equally well lighted. The method of Forced Choice was employed to equalize visits to the 2 goal boxes. A first experimental group of 9 hamsters was given 4 trials a day for 10 days to establish their preference. A control group (3 hamsters) was subjected to the same procedure. Both zones were dark and the temperature of the warm zone was dropped to 19C. The experimental group of 3 rats showed no significant difference in their preference for either the 8 or 24C. zone. The first experimental group of hamsters was placed in a 4C. room. After 4 days of hibernation the hamsters were aroused and tested for temperature preference. Analysis indicates that hamsters develop prior to hibernation a preference for the 8C. zone. After hibernation those S's showed a preference for the 24C. zone. (Author)
AD-655 588 Not available from CFSTI.

TEMPERATURE PREFERENCE IN GOLDEN HAMSTERS,
Missouri Univ Columbia Space Sciences Research Center
For primary bibliographic entry see Field 6C.
AD-655 664 HC$3.00 MF$0.65

RATE AND MAGNITUDE OF TENSION PRODUCTION OF VENTRICULAR MUSCLE FROM HIBERNATING AND NON-HIBERNATING MAMMALS,
Colorado State Univ Fort Collins Dept of Physiology
Frank E. South. 1964, 8p

Availability: Published in Proc. Rocky Mtn. Bio-Eng. Symp., USAF (1st) p251-8 1964.

Descriptors: (* Hibernation, * Cardiovascular system), (* Heart, Hibernation), Body temperature, Muscles, Cardiovascular diseases, Contraction, Rats, Hamsters, Adaptation (Physiology).

Contractility and irritability of trabecular strips of cardiac muscle obtained from rats, control hamsters and hibernating hamsters were studied at temperatures from 0 to 38C. Tension production, and its first derivative with respect to time were studied simultaneously through the use of an RCA 5734 transducer tube and DC coupled amplifiers, oscilloscope and simple differentiating circuit. The effects of temperature on the latent periods of the muscles did not differ significantly. The effects upon excitability, tension and its maximal rate of production were such that at low temperature the rat tissues were most impaired followed by those of control hamsters. Those of hibernating (5C.) animals were the least affected. The variations in response were related to inherent and adaptive differences in the intensity and duration of the active state process. (Author)
AD-655 697 Not available from CFSTI.

EFFECT OF HYPOTHERMIA ON RENAL FUNCTION OF THE MARMOT, MARMOTA FLAVIVENTRIA,
Missouri Univ Columbia Space Sciences Research Center
For primary bibliographic entry see Field 6C.
AD-655 716 Not available from CFSTI.

BIOLOGICAL AND PHYSICAL REALIZATIONS OF ABSTRACT METABOLIC MODELS,
Chicago Univ Ill Committee on Mathematical Biology
For primary bibliographic entry see Field 6C.
AD-655 724 Not available from CFSTI.

ELECTRICAL AND BEHAVIORAL RESPONSES TO AMINO ACID STIMULATION IN THE BLOWFLY,
Naval Medical Research Inst Bethesda Md
For primary bibliographic entry see Field 6C.
AD-655 747 Not available from CFSTI.

NEURONAL PATTERNS ASSOCIATED WITH AFFECTIVE RESPONSES.
Final scientific rept. 1 Feb 66-31 Jan 67,
Walson Army Hospital Fort Dix N J Mental Hygiene Consultation Service
Antonio Fernandez de Molina. 15 Feb 67, 15p
AFOSR-67-1604
Contract AF 61 (052)-939

Descriptors: (* Brain, Electrophysiology), Nerve cells, Nerve fibers, Nerve impulses, Physiology, Nervous system, Thalamus, Cats, Spain.
Identifiers: Amygdala.

The properties of the fibres of the stria terminalis have been analyzed on the basis of threshold, conduction velocity and absolute refractory period in anesthetized cats in which the stria terminalis was widely exposed. Both, fast and slow fibres, relay in the bed nucleus of the stria. Spontaneous unitary activity in the anterior and ventrome - dial hypothalamus had a predominant frequency of 6/ sec., being both facilitated and inhibited by amygdaloid stimulation. Correlation of neuronal firing patterns, amygdaloid efferent pathways and location of units has been analized. (Author)
AD-655 796 HC$3.00 MF$0.65

SOME MECHANISMS FOR A THEORY OF THE RETICULAR FORMATION FINAL REPORT, 15 NOV. 1965 - 14 NOV. 1966.
Michigan State Univ., East Lansing. Div. of Engineering Research.
J. Blum, W. L. Kilmer, and W. S. Mc Culloch.
Feb 67, 144p NASA-CR-85698, AFOSR-67-0928
Contracts NSR-22-009-138, AF 33/615/-1747

Descriptors: * Biological model, * Central nervous system, * Hybrid computer, * Probability theory, Anatomy, Array, Behavior, Biological, Cell, Central, Column, Computer, Coupling, Focusing, Impulse, Logic, Mathematics, Module, Nerve, Nervous, Nonlinear, Physiology, Probability, Program, System, Theory.

For abstract, see STAR 05 17.
N67-30915 HC$3.00 MF$0.65

BODY SEGMENT PARAMETERS.
Final technical rept.,
New York Univ., N. Y. Research Div.
Rudolfs Drillis, and Renato Contini. Sep 66, 114p
TR-1166.03

Descriptors: (* Anthropometry, * Prosthetics), Body weight, Volume, Center of mass, Biophysics, Inertia, Moment of inertia, Density, Population (Mathematics), Casting, Rehabilitation, Stress (Physiology), Tolerances (Physiology), Statistical analysis.
Identifiers: Biomechanics.

The procedures outlined provide suitable results for body segment parameter determinations where these are desired on the population for which the study was conducted. The data may be used on other populations but must be applied with judgment. The techniques which were developed for determining body segment parameters, should be used for determining these parameters on other age groups and where there are distinguisable differences in body configuration. These body parameters and the variations therein should have important clinical implications in the functional restoration of the physically disabled. They should provide clues for improvement of the design of assistive devices, prostheses and orthoses and also provide an additional means for following the progress the therapy prescribed in other pathophysiological situations.
PB-174 945 HC$3.00 MF$0.65

6Q. Protective Equipment

INVESTIGATION OF EAR PLUGS FOR PROTECTION AGAINST GUN BLAST.
Army Medical Research Lab Fort Knox Ky
5 Aug 44, 18p

Descriptors: (* Ear protectors, Effectiveness), Blast, Military personnel, Guns, Exposure, Audiometry, Hearing, Deafness.

Acoustic protection is needed for all personnel who are regularly exposed to the noise of gun fire or to blast. The characteristics and course of the temporary loss are like that following exposure to sustained high noise levels. Expedients in current use (cotton and waste) are unsanitary and not entirely reliable. Of the plugs tested, NODS, and the baffled rubber stopper were inadequate and impractical to use. M.S.A. Ear Defenders, N.D.R.C. Ear Wardens and Sepco Plugs provide the best protection against temporary loss. Sepco plugs are somewhat less satisfactory because of higher attenuation of speech. (Author)
AD-655 569 HC$3.00 MF$0.65

TEST OF EXPENDABLE DUST RESPIRATOR, E5.
Army Medical Research Lab Fort Knox Ky
3 Jan 45, 6p

Descriptors: (* Protective masks, Efficiency), Acceptability, Dust, Military personnel, Effectiveness, Respirators.

Preliminary tests indicate that the expendable respirator E5, provides adequate protection against nuisance dusts with no greater resistance to breathing than is expected of any practical respirator. Limited observations during use indicate that the respirator is reasonably comfortable and that its dust-removing efficiency is adequate to eliminate all irritation and discomfort associated with breathing dust-laden air. (Author)
AD-655 571 HC$3.00 MF$0.65

DUST EXPOSURE IN ARMORED VEHICLES.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 5E.
AD-655 574 HC$3.00 MF$0.65

TEST OF EAR PROTECTIVE DEVICES. SILENTS.
Army Medical Research Lab Fort Knox Ky
15 Oct 45, 6p

Descriptors: (* Ear protectors, Effectiveness), Tests, Military personnel, Blast, Attenuation, Hearing, Standardization, Acceptability.

Blast protection and attenuation offered by subject device were slightly inferior to standardized V51R ear protector. For periods of wear of one hour or longer the Silents were uncomfortable and irritating. Universal size arrangement of subject plug is a desirable feature of the subject device. The principle of closing the ear canal entrance rather than depending upon an insert into the canal is desirable, providing a satisfactory acoustic seal is maintained. (Author)
AD-655 580 HC$3.00 MF$0.65

AUTOMATIC TEMPERATURE CONTROL FOR LIQUID-COOLED FLIGHT SUITS.
Final rept. Jun 66-Mar 67,
Honeywell Inc St Paul Minn Research Dept
Glen L. Merrill, and James B. Starr. 3 Aug 67, 83p
Rept no. 12045-FR1
NADC-AC-6702
Contract N156-48547

Descriptors: (* Flight clothing, Temperature control), Automatic, Liquid cooled, Fluid amplifiers, Sensors, Skin, Surface temperatures, Water, Control systems.

An automatic control system for maintaining constancy of skin temperature (T sub s) has been shown to be feasible by using special sensors to detect changes in T sub s and proportional fluid amplifiers to regulate the temperature of water flowing through the tubing of a water-cooled undergarment. Tests have indicated the response of the system when T sub s increased due to exercise or to an external heat load. (Author)
AD-655 834 HC$3.00 MF$0.65

6R. Radiobiology

RADIOISOTOPES IN RADIATION PROCESSED FOODS.
Vanderbilt Univ., Nashville, Tenn. School of Medicine.
For primary bibliographic entry see Field 6H.
AD-424 425 HC$3.00

A MATHEMATICAL MODEL FOR POST-IRRADIATION HEMATOPOIETIC RECOVERY,
Rand Corp Santa Monica Calif
J. P. OKunewick, and A. L. Kretchmar. Jul 67, 40p Rept no. RM-5272-PR
Contract F44620-67-C-0045

Descriptors: (* Hemopoietic system, * Radiation effects), Recovery, Mathematical models, Compu-

ter programs, Erythrocytes, Radiological dosage, Experimental data.
Identifiers: Stem cells.

A mathematical model is presented of the recovery after irradiation of the system producing blood cells in the body. The model is based on the hypothesis that hematopoietic stem cells, which are unable to reproduce as stem cells following irradiation, may still retain an ability to differentiate. The model demonstrates both an abortive recovery rise and a true recovery rise following irradiation. As a first approximation, the model shows no irreconcilable differences from experimental data and generally represents the phenomena observed in the recovery of erythropoiesis following acute irradiation. In addition, certain postulates basic to blood-cell development are derived. (Author)
AD-655 345 HC$3.00 MF$0.65

CALCULATION OF TIME-TEMPERATURE HISTORIES AND PREDICTION OF INJURY TO SKIN EXPOSED TO THERMAL RADIATION.
Phase rept.,
Naval Air Development Center Johnsville Pa Aerospace Medical Research Dept
John A. Weaver. 14 Jun 67, 38p Rept no. NADC-MR-6623

Descriptors: (*Radiation injuries, Computer programs), (*Skin, Radiation injuries), Thermal radiation, Burns, Mathematical analysis, Equations.

A general description is given of a digital computer program used in connection with the study of injury of skin exposed to thermal energy. All of the information necessary for a detailed understanding of the program is included; however, the material is presented in a manner such that a novice in the field of computer science may make use of the program if he so desires. For this reason emphasis is placed on the operating instructions for the program. A short discussion of the pertinent theory and equations as they apply to the human skin is included at the beginning of this report. (Author)
AD-655 438 HC$3.00 MF$0.65

THE SUSCEPTIBILITY OF MICE TO AIRBORNE INFECTIONS FOLLOWING CONTINUOUS EXPOSURE TO LOW DOSE RATE GAMMA RADIATION.
Naval Radiological Defense Lab., San Francisco, Calif.
For primary bibliographic entry see Field 6E.
AD-806 757 HC$3.00 MF$0.65

DOSIMETRY CARRIED OUT AT C E N- GRENOBLE FOR THE LIQUID ORGANIC LOOPS IN THE ORGEL PROJECT.
Dosimetrie Effectuee Au Cen-grenoble pour les Boucles A Liquides Organiques Dans le Cadre Du Projet O. R. G. E. L.
Commissariat A L Energie Atomique, Grenoble (France). Centre D'etudes Nucleaires.
P. Mas. 4 Nov 65, 10p CONF-651154-4
in French Presented At Symp. on Flux Meas. Used in Connection With Irradiation Equipment in Res. and Mater. Test Reactors, Grenoble, France, 15-17 Nov. 1965

Descriptors: *Dosimetry, *Orgel reactor project, *Radiation dose, Conference, Dose, Flux, Gamma, Liquid, Loop, Neutron, Organic, Radiation, Radiolysis, Ray, Reactor, Terphenyl.

For abstract, see STAR 05 17.
N67-31073 HC$3.00 MF$0.65

6S. Stress Physiology

CHIMPANZEE PHYSIOLOGICAL TOLERANCE TO BREATHING 100% OXYGEN AT 15 PSI,
Aeromedical Research Lab. (6571st), Holloman AFB, N. Mex.
Thomas L. Gleason, and Robert H. Edwards. May 63, 146p ARL-TDR-63-14

Descriptors: (*Oxygen consumption, Chimpanzees), (*Oxygen, Toxicity), Tolerances (Physiology), Psychomotor tests, Heart, Skin, Body temperature, Blood chemistry, Blood counts, Urine, Pressure breathing, Stress (Physiology).

In a counterbalanced experiment four restrained, immature chimpanzees were subjected to a 100% oxygen environment at 14.7 psia for over 15 hours. During this period they were isolated in a chamber and performed various psychomotor tasks. These same animals served as subjects for the same period of time in a 20% oxygen environment. Relative humidity was maintained at 45 - 55%; temperature was maintained at 79 - 81F; environmental CO_2 was lower than 3.8 mm Hg. Heart rate, respiratory rate, and skin and rectal temperatures were monitored during the experiments. Clinical examinations, hematological and serum biochemical determinations, and urinalyses were performed before and following each test. The only significant findings were a relative bradycardia and tachypnea in the hyperoxygenated environment. (Author)
AD-408 323 HC$3.00

TRENDS IN SYSTOLIC BLOOD PRESSURE IN THE THOUSAND AVIATOR COHORT OVER A 24-YEAR PERIOD,
Naval Aerospace Medical Inst Pensacola Fla
For primary bibliographic entry see Field 6E.
AD-655 250 HC$3.00 MF$0.65

HANDLING QUALITIES AND PILOT WORK LOAD,
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio Control Criteria Branch
For primary bibliographic entry see Field 5E.
AD-655 340 HC$3.00 MF$0.65

PHYSIOLOGICAL PRINCIPLES OF A SOJOURN OF A HUMAN IN CONDITIONS OF RAISED PRESSURE OF THE GASEOUS MEDIUM,
Foreign Technology Div Wright-Patterson AFB Ohio
G. L. Zaltsman. 17 Apr 67, 190p Rept no. FTD-MT-65-245
TT-67-62351
Edited machine trans. of mono. Fiziologicheskie Osnovy Prebyvaniya Cheloveka v Usloviyakh Povyshennogo Davleniya Gazovoi Sredy, Leningrad, 1961 188p.

Descriptors: (*Pressure breathing, Responses), Stress (Physiology), Gases, Respiration, Decompression sickness, Life support, Physiology, Oxygen, Toxicity, Nitrogen, Carbon dioxide, Helium group gases, Anesthesia, Central nervous system, USSR.

The monograph describes the manifold processes arising in the organism with an increase in the pressure of oxygen, air, and artificial gas mixtures. Various types of physiological effect of raised pressures are analyzed in the light of contemporary concepts of the stimulus, the process of irritation, and physiological and pathological response reactions. For the study of the state a human in the conditions of the applied pressures of the gaseous environment there are developed methodical procedures which allow characterization of nervous processes from elementary unconditioned responses to complicated cortical reactions. As a result of the investigations three types of suppression of the work of the brain which arise under the action of raised pressures are singled out.
AD-655 360 HC$3.00 MF$0.65

PSYCHOMOTOR FUNCTIONS, THE BODY IMAGE, AND AVIATION,
Naval Personnel Research Activity San Diego Calif
For primary bibliographic entry see Field 5J.
AD-655 434 HC$3.00 MF$0.65

HUMAN ACCELERATION EXPERIENCE AT THE U.S. NAVAL AIR DEVELOPMENT CENTER-JOHNSVILLE: 1 JANUARY 1961-30 DECEMBER 1965.
Phase rept.,
Naval Air Development Center Johnsville Pa Aerospace Medical Research Dept
Elihu York, R. J. Oleynik, and R. M. Patton. 31 May 67, 18p Rept no. NADC-MR-6711
NAVMED-MF022.01.03-7001-12

Descriptors: (*Acceleration tolerance, Experimental data), Stress (Physiology), Blackout (Physiology), Arrhythmia, Motion sickness, Centrifuges, Simulation, Pathology, Respiration, Electrocardiography, Aviation medicine, Space medicine.
Identifiers: Greyout.

A five year retrospective survey was undertaken in order to learn the consequences of acceleration exposure on human subjects. Utilizing a punched-card data system, 5071 human subject runs involving 380 individuals were analyzed. Symptomatology occurred in 75% of Gz runs and 52% of Gx runs. During 2380 +Gz runs greyout was noted 351 times and blackout 167 times; during 2557 +Gx runs, chest pain occurred 104 times, motion sickness 97 times, cardiac arrythmia and dyspnea 29 times each. Miscellaneous complaints during acceleration included myalgia, headache and abdominal pain. No disabling sequelae were noted in any subject. A medical monitoring system comprised of voice communication, television observation, and electrocardiographic recording from the subject proved to be a safe system for recording minimal responses. As man is exposed to more hazardous environments of high-performance jet aircraft or space capsules, more detailed information involving further experimentation with the human centrifuge may be required, employing complex monitoring systems, in order to gain adequate knowledge of man's tolerance to acceleration, an important variable affecting manned flight. (Author)
AD-655 436 HC$3.00 MF$0.65

OPERATIONAL AND PHYSIOLOGICAL CHARACTERISTICS OF THE TANK T26E3.
Army Medical Research Lab Fort Knox Ky
19 Jun 45, 8p

Descriptors: (*Fatigue (Physiology), Performance (Human)), Oxygen consumption, Efficiency, Operation, Tanks (Combat vehicles), Human engineering, Heat tolerance, Stress (Physiology), Weight, Handling, Energy, Military personnel.

The work rate of driving the tank T26E3 is moderate. The work rate of loading in the tank T26E3 is high. Impaired loader performance results from excessive fatigue and reduced tolerance to severe humidity and heat. The efficiency of loading, measured by loading speed, is poor in comparison to previously studied tanks. Higher work rates and reduced loading speeds result from increased size and weight of rounds, and are modified by the stowage of rounds. (Author)
AD-655 570 HC$3.00 MF$0.65

CREW FATIGUE RESEARCH.
Final rept.
Army Medical Research Lab Fort Knox Ky
5 May 43, 8p

Descriptors: (*Tanks (Combat vehicles), Human engineering), (*Fatigue (Physiology), Performance (Human)), Maneuverability, Military personnel.

From the point of view of driver fatigue, the Bendix Power Control tank No. 908 is better than the standard M4A2 medium tank. The work output

of the driver was 50% greater when operating the standard medium tank M4A2 than when driving the Bendix Power Control tank No. 908. Driver fatigue in the Bendix Power Control tank No. 908 was not excessive. The fatigue resulting from driving the standard tank, if it could be run over such terrain for many hours without mechanical failure, would be excessive. On short runs of from 3 to 6 hours the driver of the standard tank showed higher pulse rates, had more symptoms of fatigue, and felt more tired than was the case when driving tank No. 908.
AD-655 575 HC$3.00 MF$0.65

AIR SICKNESS AND ANXIETY,
Naval Aerospace Medical Inst Pensacola Fla
Gary J. Tucker, and Roger F. Reinhardt. 12 Dec 66, 24p Rept no. NAMI-988

Descriptors: (*Motion sickness, Anxiety), Attitudes, Aviation personnel, Stress (Psychology), Performance (Human), Aviation medicine, Training, Autonomic nervous system, Motivation, Psychophysiology, Etiology, Instructors, Correlation techniques, Questionnaires, Aviation medicine.

The report explores the relation of airsickness experienced early in flight training to anxiety, attrition rates, and the instructor-student interaction. During a two-month period, all students undergoing primary flight instruction (N=141) filled out a detailed questionnaire immediately after their fifth flight. Seventy-two of these students, randomly selected, were studied more intensively, in that: (1) their flight instructor also filled out a questionnaire after the fifth flight, and (2) this group was surveyed again at the completion of primary training. The airsick group differed significantly from the nonairsick in the following subjective areas: (1) more nervousness, (2) more autonomic symptoms, (3) lower motivation, and (4) finding instructors less likable. The airsick group tended to have a higher attrition rate, and still experienced more anxiety at the completion of primary training. The data represent the first large scale correlation of airsickness in early flight training with subjective anxiety, and, as such, present many theoretical and practical implications. (Author)
AD-655 633 HC$3.00 MF$0.65

EFFECTS OF TRANSVERSE G-STRESS ON RUNNING MEMORY.
Phase rept.,
Naval Air Development Center Johnsville Pa Aerospace Medical Research Dept
Randall M. Chambers, and Bruce M. Ross. 17 Feb 67, 7p Rept no. NADC-MR-6712
Prepared in cooperation with Catholic Univ. of America, Washington, D. C. Center for Research in Thinking and Language.
Availability: Published in Perceptual and Motor Skills v24 p423-35 1967.

Descriptors: (*Stress (Physiology), *Memory), Performance tests, Errors, Symbols, Acceleration, Stress (Psychology), Anxiety, Experimental design, Statistical analysis, Performance (Human).

A 2-channel running memory task with 2 random binary series as stimuli was used to test Ss under 4 levels of transverse G-stress. No memory deficit was found at 3G. Significant memory deficit was found at 5G and 7G with still greater deficit at 9G. Most of the deficit occurred during the latter half of each 2-min. and 18-sec. stress-period. Serial-order error ranking for retained symbols was similar for both stress and non-stress performance, but stress increased error for all serial orders. However, stress vs non-stress differences were found in serial orders that included a previously correct symbol that S had to disregard. This irrelevant symbol was an important error factor in non-stress performance but not in stress performance where S curtailed the number of symbols he processed each trial. (Author)
AD-655 835 Not available from CFSTI.

PROCEEDINGS OF THE CONFERENCE ON THE DESIGN OF EXPERIMENTS IN ARMY RESEARCH, DEVELOPMENT AND TESTING (11th).
For primary bibliographic entry see Field 12A.
AD-803 008 HC$3.00

EGOCENTRIC VISUAL LOCALIZATION IN NORMALS AND PARTIALLY BLIND DURING A CHANGE IN DIRECTION OF GRAVITOINERTIAL FORCE.
Naval School of Aviation Medicine, Pensacola, Fla.
B. Clark, and A. Graybiel. 2 May 67, 9p NASA-CR-85815, NAMI-1006
NASA ORDER R-93

Descriptors: *Blindness, *Centripetal force, *Visual perception, Centripetal, Darkness, Effect, Force, Horizon, Human, Normal, Partial, Perception, Rotation, Stimulation, Subject, Velocity, Vestibular, Vision, Visual.

For abstract, see STAR 05 17.
N67-31380 HC$3.00 MF$0.65

6T. Toxicology

SAFETY PROCEDURES FOR HIGH ENERGY FUELS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 13L.
AD-655 423 HC$3.00 MF$0.65

THE EFFECT OF NITROGEN DIOXIDE-NITROGEN TETROXIDE ON OXYHEMOGLOBIN DISSOCIATION.
Final rept. Mar-Sep 66,
School of Aerospace Medicine Brooks AFB Tex
William H. Pryor, Harold L. Bitter, and Raymond J. Bertler. Apr 67, 13p Rept no. SAM-TR-67-33

Descriptors: (*Nitrogen oxides, Toxicity), (*Hemoglobin, Dissociation), Poisonous gases, Dioxides, Tetroxides, Air pollution, Respiration.

Twelve dogs were exposed to 180 p.p.m. nitrogen dioxide-nitrogen tetroxide until death occurred. Oxyhemoglobin dissociation curves were plotted on each subject before and after exposure. Percent saturation was thus used as a measure of ability to transport oxygen. It was determined that NO2/N2O4 exposure reduced the oxygen-carrying capacity of hemoglobin by 10% to 15% throughout the physiologic range. There was a rise in methemoglobin concentration that was not sufficient to account for the shift in the oxyhemoglobin dissociation curve, despite its being statistically significant. Although chronic exposures were not a part of this study, itis suggested that a similar reduction in hemoglobin function could result from long-term inhalation of air polluted with these gases. (Author)
AD-655 595 HC$3.00 MF$0.65

PROCEEDINGS OF THE CONFERENCE ON THE DESIGN OF EXPERIMENTS IN ARMY RESEARCH, DEVELOPMENT AND TESTING (11th).
Army Research Office, Durham, N. C.
For primary bibliographic entry see Field 12A.
AD-803 008 HC$3.00

TOXICOLOGIC EVALUATION OF 2-2' (9-10-ANTHRYLENEDIMETHYLENE) - BIS - 2 - PSEUDOTHIOUREA DIHYDROCHLORIDE DIHYDRATE (NSC-56054).
Mason Research Inst., Worcester, Mass.
For primary bibliographic entry see Field 6O.
PB-174 873 HC$3.00 MF$0.65

TOXICOLOGIC EVALUATION OF ESTRA-1,3,5 (10-TRIEN-17 BETA-ol, 3 METHOXY-17- (TRIFLUOROVINLY)- (NSC-73865E).
Mason Research Inst., Worcester, Mass.
For primary bibliographic entry see Field 6O.
PB-174 874 HC$3.00 MF$0.65

7. CHEMISTRY

7A. Chemical Engineering

FOREIGN SCIENCE BULLETIN, VOL. 3, NO. 6, 1967.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 20E.
AD-655 339 HC$3.00 MF$0.65

OPTIMAL CONTROL OF DISTRIBUTED PARAMETER CHEMICAL REACTORS.
Technical rept.,
Northwestern Univ Evanston Ill Information-Processing and Control Systems Lab
Kun S. Chang. Jul 67, 111p Rept no. TR-67-112
Contract N00014-67-A-0356-0003, Grant NSF-GP-2175

Descriptors: (*Industrial equipment, Control systems), (*Chemical industry, Control systems), (*Control systems, Optimization), Reaction kinetics, Control, Synthesis, Partial differential equations, Oscillation.
Identifiers: Reactors (Chemical).

The synthesis of optimal control of distributed parameter processes governed by a system of simultaneous partial differential equations of the first-order in two independent and n dependent variables is considered. The theory on necessary conditions for optimal control,the computational algorithm based on the first-order variations, and the method of characteristics are applied to the optimal control of a plug-flow tubular reactor with non-linear chemical kinetics. Optimal response to oscillatory feed disturbances is also investigated. In some cases it may be desirable to operate under intentionally oscillatory input conditions. Extensive numerical computations are presented. (Author)
AD-655 468 HC$3.00 MF$0.65

X-RAY POWDER DIFFRACTION PATTERNS OF SOME n-ALKANONE UREA INCLUSION COMPOUNDS,
Frankford Arsenal Philadelphia Pa Pitman-Dunn Research Labs
For primary bibliographic entry see Field 7C.
AD-655 597 Not available from CFSTI.

MOLECULAR PHOTOCHEMISTRY,
Columbia Univ New York Dept of Chemistry
For primary bibliographic entry see Field 7E.
AD-655 730 Not available from CFSTI.

COAL PROCESSING BY ELECTROFLUIDICS, PHASE II.
Rept. for 11 May 65-1 Apr 67.
Iowa State Univ. of Science and Tech., Ames.
1 Apr 67, 123p
Contract 14-01-0001-479

Descriptors: (*Fluidized bed processes, *Coal), (*Hydrogen, Industrial production), Gas generating systems, Charcoal, Steam, Decomposition,

Economics, Feasibility studies, Heating, Carbon dioxide, Carbon monoxide, Industrial equipment, Industrial plants, Costs, Carbon compounds, Sulfides, Hydrogen compounds, Cyanides.
Identifiers: Carbon disulfide, Hydrocyanic acid.

The purpose of the investigation was to develop coal utilization processes which can be carried out advantageously in an electrofluid bed reactor. The first process studied was the manufacture of hydrogen by the steam-carbon reaction. The electrofluid bed reactor consists of an electrically heated fluidized bed of conducting solids. The report contains a summary of the experimental data collected on the gasification of coal char using steam and the results of a study on the contact resistance between a fluidized bed and an electrode placed in it. A preliminary economic evaluation of a process for producing hydrogen is also included as are preliminary economic evaluations of processes for producing carbon disulfide and hydrogen cyanide. (Author)
PB-174 927 HC$3.00 MF$0.65

COMBINED DESALINATION AND POWER GENERATION USING COAL ENERGY. PHASE II. INVESTIGATION OF EMERGING TECHNOLOGY, BY-PRODUCT RECOVERY, AND VERY LARGE CAPACITIES.
Rept. for Jan 66-Jan 67,
Kellogg (M. W.) Co., Piscataway, N. J. Research and Development Center.
W. H. Heffner, E. J. Lemieux, A. G. Sliger, H. D. Terzian, and A. C. Veverka. 31 Jan 67, 151p
RED-67-1130
Contract DI-14-01-0001-481

Descriptors: (*Desalination, Power supplies), (*Coal, Desalination), (*Electric power production, Fuels), Water supplies, Industrial plants, Economics, Wastes (Industrial), Salts, Sulfur, Combustion products, Processing, Sea water, Site selection, Coal gas.

The report presents the results of a study of certain aspects of combination plants for desalting water and generating electricity using coal as the source of energy. Topics include: Emerging technology in the areas of power generation (improvements in the steam-electric cycle, non-conventional power sources), desalination (especially reverse osmosis and multi-stage flash distillation processes), and coal gasification, recovery of by-products, such as salts, sulfur, and coal ash, as a means of cost reduction; advantages of scaling-up to very large plants; sources of capital costs; economic bases of combination plants; water costs under various conditions.
PB-174 938 HC$3.00 MF$0.65

MATERIALS RESEARCH AT STANFORD UNIVERSITY.
Stanford Univ., Calif. Center for Materials Research.
For primary bibliographic entry see Field 11G.
PB-174 980 HC$3.00 MF$0.65

CHEMICAL PROCESSING.
Agency for International Development, Washington, D. C. Communications Resources Div.
Jun 57, 161p
Prepared in cooperation with Little (ArthurD.), Inc., Cambridge, Mass.

Descriptors: (*Chemical industry, *Industrial equipment), (*Driers (Apparatus), Operation), (*Evaporators, Operation), (*Filters (Fluid), Operation), (*Heat exchangers, Operation), (*Pressure vessels, Operation), Design, Costs, Materials, Construction, Industrial plants, Industrial production.
Identifiers: Reactors (Chemical).

The manual describes some of the basic equipment for the establishment of chemical processing industries. Six types of equipment (dryers, evaporators, pressure filters, jacketed process vessels, heat exchangers, and rotary vacuum filters) are described, their costs, principles and methods of operation, and several applications. The manual is designed as a guide for the operation of many of the more important chemical process systems, which are significant in a growing industrial economy. It should be of help in the planning stages of almost any process industry. However, it is important to note that in most cases, plans for actual installations will require specific engineering and financial advice in order to meet specific local situations.
PB-175 534 HC$3.00 MF$0.65

7B. Inorganic Chemistry

A COLLECTION OF ALGORITHMS FOR SEARCHING CHEMICAL COMPOUND STRUCTURE ANALOGS,
General Electric Co., Huntsville, Ala. Computer Dept.
For primary bibliographic entry see Field 5B.
AD-460 819 HC$3.00

HIGH SPEED DISPLAY OF CHEMICAL NOMENCLATURE, MOLECULAR FORMULA AND STRUCTURAL DIAGRAM,
General Electric Co., Huntsville, Ala. Computer Dept.
For primary bibliographic entry see Field 5B.
AD-460 820 HC$3.00

ORGANOMETALLIC CHEMISTRY OF THE TRANSITION METALS XX. SOME REACTIONS OF ACETONITRILE DERIVATIVES OF MOLYBDENUM AND CHROMIUM CARBONYLS WITH OLEFINIC AND ACETYLENIC COMPOUNDS,
Mellon Inst Pittsburgh Pa
For primary bibliographic entry see Field 7C.
AD-655 219 Not available from CFSTI.

HETEROPOLY BLUES. II. REDUCTION OF 2:18-TUNGSTATES,
Georgetown Univ Washington D C Dept of Chemistry
Michael T. Pope, and Elias Papaconstantinou. 15 Jan 67, 10p
AROD-4598:3
Grant DA-ARO (D)-31-124-G512
See also AD-639 412.
Availability: Published in Inorganic Chemistry v6 n6 p1147-52 1967.

Descriptors: (*Complex compounds, Tungstates), (*Tungstates, Reduction (Chemistry)), Ions, Oxidation-reduction reactions, Electrochemistry, Molecular structure, Stability, Decomposition, Disproportionation, Volumetric analysis, Polarographic analysis, Phosphorus compounds, Arsenic compounds.
Identifiers: Heteropoly blues, Tungstodiarsenates, Tungstodiphosphates.

The three heteropoly anions A- (P2W18O62) (6-), B- (P2W18O62) (6-), and (As2W18O62) (6-) are reduced in acidic and neutral solutions at the dropping mercury and rotating platinum electrodes. The initial reduction steps correspond to the addition of up to six electrons per anion. The reduced species are quite inert to alkaline degradation, permitting an investigation of the redox behavior of the polytungstate structure in solutions of pH 0-13. By using the reduced anion (PW12O40) (5-) it was possible to show that the Keggin structure can also accept at least six electrons in neutral and alkaline solutions. (Author)
AD-655 224 Not available from CFSTI.

HETEROPOLY BLUES. III. PREPARATION AND STABILITIES OF REDUCED 18-MOLYBDODIPHOSPHATES,
Georgetown Univ Washington D C Dept of Chemistry
Elias Papaconstantinou, and Michael T. Pope. 15 Jan 67, 8p
AROD-4598:4
Grant DA-ARO (D)-31-124-G512
Availability: Published in Inorganic Chemistry v6 n6 p1152-5 Jun 1967.

Descriptors: (*Complex compounds, Molybdates), (*Molybdates, Reduction (Chemistry)), Ions, Synthesis (Chemistry), Stability, Phosphorus compounds, Arsenic compounds, Purification, Volumetric analysis, Polarographic analysis, Molecular structure, Disproportionation, Electrochemistry.
Identifiers: Heteropoly blues, Molybdodiarsenates, Molybdodiphosphates.

The heteropoly anions (P2Mo18O62) (6-) and (As2Mo18O62) (6-) each undergo three successive two-electron reductions in acidic solutions. No intermediate reduction steps were observed. The reduced heteropoly molybdates are weaker acids than the corresponding tungstates and disproportionate more rapidly in neutral and alkaline solutions. Crystalline samples of ammonium salts and solutions of the free acids of the three reduced molybdophosphates were characterized. (Author)
AD-655 225 Not available from CFSTI.

ULTRAHIGH PRESSURE-HIGH TEMPERATURE SYNTHESIS OF RHOMBOHEDRAL DICHALCOGENIDES OF MOLYBDENUM AND TUNGSTEN,
Pennsalt Chemicals Corp King of Prussia Pa Research and Development Dept
Meyer S. Silverman. 17 Nov 66, 4p
AROD-5706:4
Contract DA-31-124-ARO (D)-362
Availability: Published in Inorganic Chemistry v6 p1063-4 1967.

Descriptors: (*Molybdenum compounds, Synthesis (Chemistry)), (*Tungsten compounds, Synthesis (Chemistry)), (*Sulfides, Synthesis (Chemistry)), (*Selenides, Synthesis (Chemistry)), High-pressure research, High-pressure research, Crystal structure, X-ray diffraction analysis.
Identifiers: Molybdenum diselenide, Molybdenum disulfide, Tungsten disulfide.

Ultrahigh-pressure, high-temperature treatment of elemental Mo-S, W-S, and Mo-Se mixtures resulted in the synthesis in each system of the rhombohedral form of the respective dichalcogenide. In addition, hexagonal molybdenite was transformed directly to the rhombohedral form at extreme temperatures and pressures. (Author)
AD-655 307 Not available from CFSTI.

MASS SPECTROMETRIC DETECTION OF LABILE HYDRIDES FORMED BY ATOMIC HYDROGEN REACTIONS,
Aerospace Corp El Segundo Calif Labs Div
For primary bibliographic entry see Field 7D.
AD-655 376 HC$3.00 MF$0.65

ORGANOMETALLIC CHEMISTRY OF THE TRANSITION METALS XXI. SOME PI-PENTAMETHYLCYCLOPENTADIENYL DERIVATIVES OF VARIOUS TRANSITION METALS,
Mellon Inst Pittsburgh Pa
For primary bibliographic entry see Field 7C.
AD-655 408 Not available from CFSTI.

A PHOSPHORUS-31 NUCLEAR MAGNETIC RESONANCE STUDY OF TERTIARY PHOSPHINE COMPLEXES OF PLATINUM (II),
Maryland Univ College Park Dept of Chemistry
Samuel O. Grim, Richard L. Keiter, and William

McFarlane. 13 Jan 67, 7p
AFOSR-67-1613
Grant AF-AFOSR-782-65
Availability: Published in Inorganic Chemistry v6 n6 p1133-7 1967.

Descriptors: (*Platinum compounds, *Complex compounds), (*Phosphines, Nuclear magnetic resonance), Mo cular isomerism, Molecular orbitals, Microwave spectroscopy, Electrical conductance, Chlorine compounds, Chemical bonds.

The phosphorus-31 nmr spectra of eleven cis and seven trans compounds of the type (Rn (C6H5)3-n P)2PtCl2, where R = alkyl and n = 1,2, or 3, show that the platinum-195 to phosphorus-31 coupling constant is always larger for the cis compound than for the corresponding trans compound and that the phosphorus chemical shift of the cis compound is upfield from that of the corresponding trans compound. The formation of the trisphosphine complex by addition of excess tertiary phosphine to the monomer was demonstrated by conductivity and 31P nmr measurements and confirmed by isolation of the compounds ((CH3(C6H5)2P)3PtCl)Cl and ((C3H7(C6H5)2P)3PtCl)B (C6H5)4. The preparation of several new chlorine-bridged dimers is also reported. (Author)
AD-655 480 Not available from CFSTI.

MAGNETIC SUSCEPTIBILITY OF URANIUM TRIFLUORIDE IN THE RANGE 2-300K,
Cornell Univ Ithaca N Y Baker Lab of Chemistry
For primary bibliographic entry see Field 7D.
AD-655 517 Not available from CFSTI.

THE PREPARATION OF CIS- (Cr (pn)2X2)X AND CIS- (Cr (tm)2X2)X COMPLEXES BY THE THERMAL MATRIX METHOD,
Houston Univ Tex Dept of Chemistry
W. W. Wendlandt, and L. K. Sveum. 17 Oct 66, 7p
AFOSR-67-1597
Grant AF-AFOSR-1190-67
Availability: Published in J. Inorg. Nucl. Chem v29 p975-8 1967.

Descriptors: (*Complex compounds, Synthesis (Chemistry)), (*Chromium compounds, Complex compounds), (*Amines, Complex compounds), Chemical reactions, Sublimation, Spectroscopy, Halides, Thiocyanates, Decomposition.
Identifiers: Chromium diamine compounds.

The preparation and characterization of the cis (Cr (pn)2X2)X and cis- (Cr (tm)2X2)X complexes by the thermal matrix reaction are described. In general, higher temperatures were required to prepare the cis-complexes than was previously observed for the 1,2-ethanediamine complexes. The order of deamination appears to be: 1,2-ethanediamine > 1,2-propanediamine > 1,3-propanediamine. (Author)
AD-655 518 Not available from CFSTI.

ORGANOMETALLIC-CHELATE COMPOUNDS: ORGANOMETALLIC IONS AS CENTRAL METAL IONS,
University of South Florida Tampa
For primary bibliographic entry see Field 7C.
AD-655 534 Not available from CFSTI.

OPEN-SHELL HARTREE-FOCK MOLECULAR ORBITAL THEORY OF TRANSITION METAL ION COMPLEXES: KNiF,
Massachusetts Inst of Tech Cambridge National Magnet Lab
For primary bibliographic entry see Field 7D.
AD-655 723 Not available from CFSTI.

ALUMINIUM-NITROGEN AND ALUMINIUM-PHOSPHORUS POLYMERS.
Sussex Univ Brighton (England) Chemical Lab
For primary bibliographic entry see Field 7C.
AD-655 807 HC$3.00 MF$0.65

PREPARATION AND PROPERTIES OF SOME FLUOROALANES.
Technical rept.,
Dow Chemical Co Midland Mich
Edward E. Flagg, and Donald L. Schmidt. 1 Jun 67, 38p Rept no. TR-2
Contract Nonr-4968 (00)
Availability: Published in Inorganic Chemistry.

Descriptors: (*Complex compounds, Aluminum compounds), (*Aluminum compounds, Synthesis (Chemistry)), (*Fluorine compounds, Synthesis (Chemistry)), Furans, Molecular weight, Polymers, Spectra (Infrared), Nuclear magnetic resonance, Chemical bonds.
Identifiers: Fluoroalanes, Organic aluminum compounds, Tetrahydrofuran.

A series of solid fluoroalanes, AlF3-nXn.m (THF) (X=Cl, Br, I, OCH (CH3) 2; n=1,2;m=0 to 2) were prepared and studied. Monofluoroalanes were isolated as bis (tetrahydrofuran)dihalofluoroalanes, AlFX2.2 (THF); a notable exception was nonsolvated AlF (OCH (CH3)2)2. The corresponding difluoroalanes were less solvated but still tractable. Molecular weight determinations in THF indicated that difluoroalanes were more polymeric (D.P. 4-14) than the corresponding monofluoroalanes. Infrared and NMR data are given in support of fluorine bridged bonding for the difluoroalanes. (Author)
AD-655 830 Not available from CFSTI.

THEORY OF ELECTROLYTIC REDUCTION OF CHROMIC ACID.
Teorija Elektroliticke Redukcije Hromne Kiseline
International Information, Inc., Philadelphia, Pa.
S. Dordevic. Jun 67, 12p NASA-TT-F-11047
Contract NASW-1499
Transl. Into English From Zastita Mater. (Belgrade), V. 10, 1962 P 361-366

Descriptors: *Cathode, *Chromic acid, *Electrolysis, *Metal film, Acid, Chromic, Electrode, Electroplating, Equilibrium, Film, Metal, Potential, Reaction, Reduction, Theory, Thin.

For abstract, see STAR 05 17.
N67-31317 HC$3.00 MF$0.65

PROCESS DEVELOPMENT AND PILOT-PLANT PRODUCTION OF SILANE POLYMERS OF DIOLS ANNUAL SUMMARY REPORT, 22 APR. 1966 - 22 APR. 1967.
Battelle Memorial Inst., Columbus, Ohio.
W. R. Dunnavant, R. A. Markle, R. G. Sinclair, and P. B. Stickney. 22 Jun 67, 161p NASA-CR-85820, ASR-2
Contract NAS8-11837

Descriptors: *Cross linking, *Polymer chemistry, Aryl, Chemistry, Cross, Diol, High, Linearity, Linking, Molecular, Organic, Oxide, Polymer, Preparation, Silane, Synthesis, Weight.

For abstract, see STAR 05 17.
N67-31379 HC$3.00 MF$0.65

13CS2 SYNTHESIS FOR CARBON-13 NMR FIELD-FREQUENCY LOCK.
Master's thesis,
California Univ., Davis. Dept. of Chemistry.
John Natterstad. Nov 66, 3p
Grant NSF-GP-3776

Descriptors: (*Nuclear magnetic resonance, Standards), (*Labeled substances, Synthesis (Chemistry)), (*Carbon compounds, Synthesis (Chemistry)), Sulfides, Stable isotopes, Spectrometers, Capillary tubes, Methane, Sulfur.
Identifiers: Carbon disulfide.

The document is comprised of a brief extract of a masters thesis which describes a possibly patentable method for small-scale synthesis of carbon-13 labelled carbon disulfide, and for the use of this material as a field-frequency lock for C-13 nuclear magnetic resonance spectroscopy.
PB-174 917 HC$3.00 MF$0.65

7C. Organic Chemistry

RESEARCH AND ANTIRADIATION DRUGS.
Monsanto Research Corp., Everett, Mass.
For primary bibliographic entry see Field 6O.
AD-419 104 HC$3.00

A COLLECTION OF ALGORITHMS FOR SEARCHING CHEMICAL COMPOUND STRUCTURE ANALOGS,
General Electric Co., Huntsville, Ala. Computer Dept.
For primary bibliographic entry see Field 5B.
AD-460 819 HC$3.00

HIGH SPEED DISPLAY OF CHEMICAL NOMENCLATURE, MOLECULAR FORMULA AND STRUCTURAL DIAGRAM,
General Electric Co., Huntsville, Ala. Computer Dept.
For primary bibliographic entry see Field 5B.
AD-460 820 HC$3.00

CHEMICAL SHIFT NONEQUIVALENCE OF DIASTEREOTOPIC GROUPS IN SULFONIUM SALTS,
Princeton Univ N J Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-655 216 Not available from CFSTI.

ORGANOMETALLIC CHEMISTRY OF THE TRANSITION METALS XX. SOME REACTIONS OF ACETONITRILE DERIVATIVES OF MOLYBDENUM AND CHROMIUM CARBONYLS WITH OLEFINIC AND ACETYLENIC COMPOUNDS,
Mellon Inst Pittsburgh Pa
R. B. King. 2 Aug 66, 13p
AFOSR-67-1573
Grants AF-AFOSR-580-64, AF-AFOSR-580-66
See also AD-647 522.
Availability: Published in Journal of Organometallic Chemistry v8 p139-48 1967.

Descriptors: (*Metalorganic compounds, Chemical reactions), (*Molybdenum compounds, Metalorganic compounds), (*Chromium compounds, Metalorganic compounds), Metal carbonyls, Complex compounds, Nitriles, Alkenes, Alkynes, Ketones, Halogenated hydrocarbons, Cycloalkenes.
Identifiers: Acrylonitrile chromium carbonyls, Acrylonitrile molybdenum carbonyls, Methyl vinyl tone molybdenum.

Yellow, voltatile tris (methyl vinyl ketone) molybdenum, (CH3COCH=CH2)3-Mo, was isolated in low yield from the reaction between (CH3CN)3Mo (CO)3 and methyl vinyl ketone in hexane solution. Hexafluoro-2butyne reacts with (CH3CN)3Mo (CO)3 to give white volatile crystalline ((CF3)2C2)3MoNCCH3. Reactions of cyclooctatetraene, 1,3-cyclohexadiene, and other similar olefins with the acetonitrile complexes (CH3CN)3M (CO)3 (M=Cr or Mo) are also described. (Author)
AD-655 219 Not available from CFSTI.

POLAR ADDITIONS TO OLEFINS AND ACETYLENES. IV. EVIDENCE FOR SYNCHRONOUS C-H AND C-Cl BOND FORMATION IN

THE TRANS ADDITION OF HYDROGEN CHLORIDE TO 3-HEXYNE,
California Univ San Diego La Jolla Dept of Chemistry
Robert C. Fahey, and Do-Jae Lee. 17 Feb 67, 5p
AROD-4839:2
Grant DA-ARO (D)-31-124-G585
See also AD-646 106.
Availability: Published in Journal of the American Chemical Society v89 n11 p2780-1 May 24 1967.

Descriptors: (*Alkynes, Addition reactions), (*Halogenated hydrocarbons, Synthesis (Chemistry)), Alkenes, Chlorination, Reaction kinetics, Chemical bonds, Chlorine compounds, Ketones, Stereochemistry.
Identifiers: Chloro hexenes, Hexynes.

The hydrochlorination of 3-hexyne in acetic acid was found to yield 3-chloro-trans-3-hexene, 3-chloro-cis-3-hexene, and 3-hexanone. A study of intermediate stages and of kinetics indicate a reaction mechanism involving synchronous formation of the C-H and C-X bonds, with possible competition from a vinyl cation mechanism.
AD-655 300 Not available from CFSTI.

ORTHO METALATIONS OF RING-SUBSTITUTED BENZYLDIMETHYLAMINES BY n-BUTYLLITHIUM AND CONDENSATIONS WITH BENZOPHENONE. NUCLEOPHILIC MECHANISM. CYCLIZATIONS TO PHTHALANS,
Duke Univ Durham N C Dept of Chemistry
Karl P. Klein, and Charles R. Hauser. 18 Nov 66, 10p
AROD-3581:26
Grant DA-ARO (D)-31-124-G770
Availability: Published in Journal of Organic Chemistry v32 p1479-83 May 1967.

Descriptors: (*Metalorganic compounds, Synthesis (Chemistry)), (*Lithium compounds, Metalorganic compounds), (*Benzenes, Metalation), (*O-heterocyclic compounds, Synthesis (Chemistry)), Amines, Alcohols, Benzophenones, Condensation reactions, Molecular isomerism, Deuterated compounds, Iodine compounds, Aromatic compounds, Furans.
Identifiers: Amino alcohols, Benzyl dimethylamines, Butyl lithium, Lithioamines, Phthalans.

Several 2-, 3-, and 4-substituted and one 3,5-disubstituted benzyldimethylamines were lithiated with n-butyl-lithium in ether-hexane for 1 and 24 hr, and the resulting lithioamines were condensed with benzophenone to form the corresponding carbinolamines. The two 3-substituted benzyldimethylamines afforded only one of the two possible isomers: that which arose through lithiation at the position ortho to both the dimethylaminomethyl group, and the ring substituent. The yields were generally good to excellent after the longer lithiation period. Also, deuterations of certain of the lithioamines were affected after the 1-hr period. The results indicated that a nucleophilic mechanism operated. Six of the carbinolamines were cyclized through their methiodides to form substituted phthalans, generally in good yields. Both the lithiation-condensation and the cyclization methods should be useful in synthesis. (Author)
AD-655 301 Not available from CFSTI.

ORGANOMETALLIC CHEMISTRY OF THE TRANSITION METALS XXI. SOME PI-PENTAMETHYLCYCLOPENTADIENYL DERIVATIVES OF VARIOUS TRANSITION METALS,
Mellon Inst Pittsburgh Pa
R. B. King, and M. B. Bisnette. 12 Aug 66, 14p
AFOSR-67-1601
Grant AF-AFOSR-580-66
See also AD-655 219.
Availability: Published in Journal of Organometallic Chemistry v8 p287-97 1967.

Descriptors: (*Metalorganic compounds, Transition elements), (*Complex compounds, Transition elements), Cyclopentenes, Dienes, Titanium compounds, Cobalt compounds, Iron compounds, Rhenium compounds, Molybdenum compounds, Ferrocenes, Metal carbonyls, Lithium compounds, Chemical bonds, Nuclear magnetic resonance, Spectra (Visible + ultraviolet), Spectra (Infrared).
Identifiers: Pentamethyl cyclopentadienyl compounds.

Titanium tetrachloride reacts with lithium pentamethyl cyclopentadienide in benzene solution to give red (CH3)5C5TiCl3 identical to the product previously obtained from titanium tetrachloride and butenes at elevated temperatures. Ferrous chloride reacts with lithium pentamethyl cyclopentadienide in boiling tetrahydrofuran to give yellow ((CH3)5C5)2Fe (decamethylferrocene). Pentamethyl cyclopentadiene reacts with pentachabonyliron in boiling 2,2,5-trimethylhexane to give red-violet ((CH3)5C5Fe (CO)2)2. Ultraviolet irradiation of pentamethyl cyclopentadiene with C02 (CO)8 in hexane solution gives deep red crystalline (CH3)5C5Co (CO)2. Lithium pentamethyl cyclopentadienide reacts with Re (Co)5Cl to give white (CH3)5C5Re (CO)3. Lithium pentamethyl cyclopentadienide reacts with hexacarbonyl molybdenum in boiling tetrahydrofuran to give the (C5 (CH3)5Mo (CO)3) (-) anion identified by conversion to the orange methyl derivative CH3Mo (CO)3C5 (CH3)5 with methyl iodide. However, pentamethyl cyclopentadienide itself reacts with hexacarbonyl molybdenum to give red crystalline ((CH3)5C5Mo (CO)2)2. This latter complex is postulated to contain a novel type of molybdenum-molybdenum triple bond. (Author)
AD-655 408 Not available from CFSTI.

ELECTRONIC SPECTRA OF AZA-AROMATICS IN POLYMER MATRICES.
California Univ Santa Barbara Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-655 464 HC$3.00 MF$0.65

THE EFFECT OF RING SIZE ON THE RATE OF PYROLYSIS OF CYCLOALKYL PHENYL SULFOXIDES,
Oregon State Univ Corvallis Dept of Chemistry
John L. Kice, and J. Douglas Campbell. 29 Nov 66, 5p
AFOSR-67-1614
Grant AF-AFOSR-106-65
Availability: Published in Journal of Organic Chemistry v32 p1631-3 May 1967.

Descriptors: (*Cycloalkanes, Pyrolysis), (*Sulfoxides, Pyrolysis), Elimination reactions, Cycloalkenes, Synthesis (Chemistry), Reaction kinetics, Amines, Aromatic compounds.
Identifiers: Cycloheptyl phenyl sulfoxides, Cyclohexyl phenyl sulfoxides, Cyclopentyl phenyl sulfoxides.

On being heated in aprotic solvents phenyl cycloalkyl sulfoxides undergo elimination of C6H5SOH and form the corresponding cycloalkene. The rate of this Ei elimination shows a large dependence on ring size, as the following relative rate data show: cyclopentyl, 25; cyclohexyl, 1.0; cycloheptyl, 120. These data are compared with data for pyrolysis of related amine oxides. (Author)
AD-655 482 Not available from CFSTI.

ORGANOMETALLIC-CHELATE COMPOUNDS: ORGANOMETALLIC IONS AS CENTRAL METAL IONS,
University of South Florida Tampa
Dean F. Martin. 29 Jun 66, 13p
AROD-5200:5
Grant DA-ARO (D)-31-124-G588
Availability: Published in Advances in Chemistry n62 p555-64 1966.

Descriptors: (*Chelate compounds, *Metalorganic compounds), Ions, Complex compounds, Chemical equilibrium, Reaction kinetics, Molecular association, Chemical bonds, Stereochemistry, Chemical reactions.

The paper calls attention to the need for new ions in coordination chemistry--ions that would permit more detailed physico-chemical studies to be made. ions that would facilitate studies of less familiar metals and of less familiar coordination numbers, and ions that would help studies of chemical bonding and reaction mechanisms. Organometallic ions of the type RmM (+z) are such ions, and these form metal-chelate compounds of the type RmM (Ch)z. Three aspects of the chemistry of organometallic-chelate compounds are described: (1) equilibria of compound formation; (2) kinetic and mechanistic studies of three types of reactions: (a) reactions of the coordinated ligand, (b) substitution at the 4-, 5-, or 6-coordinate metal atom, and (c) reactions of the organic moiety; and (3) studies of stereochemistry and chemical bonding. (Author)
AD-655 534 Not available from CFSTI.

THE SYNTHESIS OF SPECIAL FLUORINE-CONTAINING MONOMERS.
Technical rept.,
Colorado Univ Boulder
J. D. Park, and J. R. Lacher. Jul 67, 46p
USA-NLABS-TR-68-5-CM
Contract DA-19-129-AMC-869 (N)

Descriptors: (*Halogenated hydrocarbons, Synthesis (Chemistry)), (*Fluorine compounds, Synthesis (Chemistry)), (*Cycloalkenes, Halogenated hydrocarbons), Alkenes, Dienes, Polycyclic compounds, Chlorine compounds, Elimination reactions, Cyclobutenes, Catalysis, Polymerization, Elastomers.
Identifiers: Bicyclobutenes, Fluoro butenes.

Research on the synthesis of fluorine containing olefins and diolefins is reported. Dimerization reactions aimed at producing 'dibox' compounds are of particular interest. Reactions of note were those between 1,1,2,2-tetrafluorobutadiene 1,3 and difluorodihaloethylene followed by dihydrohalogenation with alkali to yield 2,2'-dihalo-3,3',3',4,4,4'-octafluoro bicyclobutenes. Methods of dehydrohalogenations applied to these reactions makes available a number of dienes in good yield. Codimerization of these dienes is being continued. (Author)
AD-655 537 HC$3.00 MF$0.65

EQUILIBRIUM IN FORMATION AND CONFORMATIONAL ISOMERIZATION OF IMINES DERIVED FROM ISOBUTYRALDEHYDE AND SATURATED ALIPHATIC PRIMARY AMINES,
Ohio State Univ Columbus Evans Chemistry Lab
Jack Hine, and Chuen Yuan Yeh. 28 Jan 67, 11p
AROD-5773:1-C
Grants DA-ARO (D)-31-124-G648, PHS-AM-10378
Prepared in cooperation with Georgia Inst. of Tech., Atlanta. School of Chemistry.
Availability: Published in Journal of the American Chemical Society v89 n11 p2669-76 May 24 1967.

Descriptors: (*Imines, Chemical equilibrium), (*Stereochemistry, Imines), Molecular isomerism, Synthesis (Chemistry), Aldehydes, Amines, Absorption spectrum, Ultraviolet spectroscopy, pH, Nuclear magnetic resonance, Chemical bonds.
Identifiers :Isobutylidene buty mines, Isobutylidene ethylamines, Isobutylidene methylamines, Isobutylidene propylamines, Isobutyraldehydes, Molecular conformations.

The following dimensionless equilibrium constants were determined for the formation of imines and water from isobutyraldehyde and saturated aliph-

tic primary amines in aqueous solution at 35C: i-PrCH = NMe, 4950; i-PrCH = NEt, 3490; i-PrCH = NPr-n, 4180; i-PrCH = NBu-n, 4040; i-PrCH = NPr-i, 1840; i-PrCH = NBu-t, 200. Two of the experimental methods used were based on ultraviolet measurements at the aldehyde and imine absorption maxima (at 2850 and about 2300 A, respectively). These measurements gave satisfactory agreement with a pH method based on the fact that addition of isobutyraldehyde to primary amine buffers decreases the pH by transforming the amine to the much less basic corresponding imine. Largely on the basis of nuclear magnetic resonance data it is concluded that all the imines are very largely trans compounds and that in the principal conformations one of the carbon-methyl bonds of the isobutylidene group eclipses the carbon-nitrogen double bond. Both the nmr data and the equilibrium constants for imine formation may be rationalized semiquantitatively by the assumption that rotation around the carbon-nitrogen single bond so as to eclipse the carbon-nitrogen double bond with a carbon-hydrogen bond yields a conformation that is about 2.0 kcal/mole more stable than a conformation in which the carbon-nitrogen double bond has been eclipsed by a carbon-carbon bond. (Author)
AD-655 554 Not available from CFSTI.

DETERMINATION OF ACIDITY IN PETROLEUM PRODUCTS BY THERMOMETRIC TITRIMETRY.
Rock Island Arsenal Ill
For primary bibliographic entry see Field 11H.
AD-655 589 Not available from CFSTI.

X-RAY POWDER DIFFRACTION PATTERNS OF SOME n-ALKANONE UREA INCLUSION COMPOUNDS,
Frankford Arsenal Philadelphia Pa Pitman-Dunn Research Labs
B. W. Brodman, and Jack Radell. 20 Oct 66, 8p
FA-A67-5
Availability: Published in Separation Science v2 n1 p139-42 1967.

Descriptors: (*Clathrate compounds, X-ray diffraction analysis), (*Ketones, Separation), Complex compounds, Urea, Molecular structure.

The urea-inclusion-compound-forming ability of a series of closely related ketones was measured to determine the applicability of this procedure for separating and isolating the ketones. The results indicate this can be done. (Author)
AD-655 597 Not available from CFSTI.

DICARBOXYLIC ACID-UREA COMPLEXES,
Frankford Arsenal Philadelphia Pa Pitman-Dunn Research Labs
Jack Radell, B. W. Brodman, and J. J. Domanski, Jr. 30 Jun 66, 10p
FA-A67-3
Availability: Published in Journal of Physical Chemistry v71 n6 p1596-1601 May 1967.

Descriptors: (*Complex compounds, Molecular structure), (*Carboxylic acids, Complex compounds), (*Urea, Complex compounds), Oxalic acids, Malonic acids, Succinic acids, Glutaric acids, Molecular association, Salts, Differential thermal analysis, X-ray diffraction analysis.
Identifiers: Adipic acids, Pimelic acids.

A study of the reaction of several acids with urea resulted in a series of compounds of varying stoichiometry and structure. The acids having the structure HO2C (CH2)nCO2H produced saltlike compounds with urea when n = 0 and 1 and H-bonded complexes for n = 2-5. The stoichiometry of all the complexes was 2H2NCONH2.HOOC (CH2)nCOOH, except for n = 1 which had a 1:1 ratio of urea to acid. None of the products was an inclusion compound. From the general observations it was concluded that urea and the dicarboxylic acids are unlikely to form inclusion compounds, and reports of such molecular compounds should be verified by X-ray powder diffraction measurement as well as analysis. (Author)
AD-655 677 Not available from CFSTI.

ION RADICALS. XII. THE REACTIONS OF DIARYL SULFIDES AND SULFOXIDES, BENZENE THIOLSULFONATE, AND BENZENESULFINIC ACID IN SULFURIC ACID,
Texas Technological Coll Lubbock Dept of Chemistry
H. J. Shine, M. Rahman, H. Seeger, and G.-S. Wu. 1 Jul 66, 10p
AFOSR-67-1636
Grants AF-AFOSR-23-63, AF-AFOSR-975-66
See also AD-646 422.
Availability: Published in Journal of Organic Chemistry v32 p1901-8 1967.

Descriptors: (* Free radicals, Chemical reactions), (* Organic sulfur compounds, Free radicals), Sulfides, Sulfoxides, Sulfonates, Sulfinic acids, Sulfuric acid, Electron spin resonance, Spectra (Visible + ultraviolet), Polymers, Benzenes, Thiols.
Identifiers: Benzene sulfinic acids, Benzene thiolsulfonates.

Attempts to prepare the diphenyl sulfide cation radical by the anodic oxidation of diphenyl sulfide (I) and by treating either I or diphenyl sulfoxide (II) with concentrated sulfuric acid were unsuccessful. The intense color occasionally attributed to solutions of I in sulfuric acid seems best attributed to these impurities. 4,4'-Dinitrodiphenylsulfide (III) and sulfoxide (IV) did not give a cation radical in 96% sulfuric acid. A solution of di-p-tolyl sulfide (V) in 96% sulfuric acid was initially green and gave a 15-line esr spectrum, each line being further split. The spectrum, consisting of a heptet split by two quintets is attributed to the p-tolyl sulfide cation radical. The same spectrum was obtained from di-p-tolyl sulfoxide in 96% sulfuric acid. In 95% D2SO4, (V) gave a seven-line spectrum with splitting 4.9 gauss. An old solution of (V) in 96% sulfuric acid was red and gave an esr spectrum of seven lines with a g value of 2.00786 and splitting 1.6 gauss. Solutions of phenyl benzenethiolsulfonate and benzenesulfinic acid (VI) in 96% sulfuric acid were initially colorless but soon went through a series of color changes. Associated with these changes was the development of an esr spectrum. In each case two species were responsible for the esr spectrum. The thianthrene cation radical was formed, albeit in only small amounts. Diphenyl disulfide is an early-formed product from the reactions of II. Suggestions are made for the reactions that lead to these products and the thianthrene cation radical. (Author)
AD-655 756 Not available from CFSTI.

ALUMINIUM-NITROGEN AND ALUMINIUM-PHOSPHORUS POLYMERS.
Final rept. 1 Oct 64-30 Sep 66,
Sussex Univ Brighton (England) Chemical Lab
Antony R. Cullingworth, Keith Gosling, J. David Smith, and Donald Wharmby. Jun 67, 29p
AFML-TR-67-69
Grants AF-EOAR-77-64, AF-EOAR-88-65

Descriptors: (* Metalorganic compounds, * Polymers), (* Aluminum compounds, Polymers), (* Nitrogen compounds, Polymers), (* Phosphorus compounds, Polymers), Amines, Chemical reactions, Spectra (Infrared), Nuclear magnetic resonance, Stereochemistry, Phosphines, Complex compounds, Great Britain.
Identifiers: Metalorganic polymers, Organic aluminum compounds.

The products of the reaction between methylamine and trialkylaluminiums were studied by molecular weight determinations as well as by infrared and nuclear magnetic resonance spectroscopy. Stereoisomers of (R2A1NHR)3 are indicated. The reactions of phosphine adducts of organoaluminium compounds were studied and an order of base strength with respect to triethylaluminium was established by displacement reactions. Polymers of composition (RA1PR)x were prepared but crystalline products were obtained. Aluminium-nitrogen seem to be more stable than corresponding aluminium-phosphorus frameworks. (Author)
AD-655 807 HC$3.00 MF$0.65

A FEASIBILITY STUDY ON MINIATURIZING AN AUTOMATIC AMINO ACID ANALYZER FOR USE ON APOLLO MISSION AND MARS VOYAGER MISSION PROGRESS REPORT, JAN. - JUN. 1967.
California Univ., La Jolla. Dept. of Chemistry.
K. M. Dus, J. Kraut, and S. L. Miller. Jun 67, 8p
NASA-CR-85860
Contract NGR-05-009-032

Descriptors: * Amino acid, * Analyzer, * Apollo project, Acid, Amino, Chromatography, Cybernetics, Feasibility, Ion exchange, Mission planning, Model.

For abstract, see STAR 05 17.
N67-31303 HC$3.00 MF$0.65

THE FREEZING POINTS OF HYDRAZINE-AMMONIUM PERCHLORATE MIXTURES.
Stanford Research Inst., Menlo Park, Calif.
C. H. Martin. 1 Apr 67, 12p NASA-CR-84856
Contracts NAS7-100, JPL-951581
Prepared for Jpl Its Special Rept.-1

Descriptors: * Ammonium perchlorate, * Freezing point, * Hydrazine, * Measuring apparatus, Ammonium, Apparatus, Calibration, Curve, Freezing, Low temperature, Measuring, Perchlorate, Point, Remote, Sensitivity, Shock, Solution, Thermocouple, Water.

For abstract, see STAR 05 17.
N67-31369 HC$3.00 MF$0.65

RESISTANCE OF POLYMERIC STRUCTURES TO NITROGEN TETROXIDE PROGRESS REPORT.
IIT Research Inst., Chicago, Ill. Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A. M. Stake. 15 May 67, 22p NASA-CR-85912
Contracts NAS7-100, JPL-951483
Prepared for Jpl

Descriptors: * Creep resistance, * Nitrogen oxide, * Polyethylene, Absorption, Band, Branch, Chain, Creep, Cross, Degradation, Effect, Elongation, Fluorination, Infrared, Linking, Measurement, Mechanical, Molecular, Nitrogen, Oxide, Polymer, Property, Resistance, Scission, Spectroscopy, Stress, Structure, Unsaturation, Weight.

For abstract, see STAR 05 17.
N67-31418 HC$3.00 MF$0.65

7D. Physical Chemistry

RESEARCH AND ANTIRADIATION DRUGS.
Monsanto Research Corp., Everett, Mass.
For primary bibliographic entry see Field 6O.
AD-419 104 HC$3.00

RATES OF IONIZATION AND RECOMBINATION PROCESSES IN HEATED AIR.
Technical rept.,
Picatinny Arsenal, Dover, N. J. Feltman Research Labs.
James H. Renken. Jul 64, 52p
PA-TR-3153

Descriptors: (* Plasma medium, Reaction kinetics), (* Gas ionization, Reaction kinetics), (* Recombination reactions, Reaction kinetics), (* Air,

Gas ionization), Electron transitions, Excitation, Ionization, Electrons, Hydrogen, Oxygen, Nitrogen, Ions, Nuclear explosions.

The procedures used to calculate rate constants for certain ionization and recombination reactions are described. Results of calculations based upon these procedures and analytical expressions which approximate the values found with the computer are presented. The only recombination reactions treated are those which yield a hydrogenic ion. Extension of the present formalism to cases where multi-electron ions are formed is restricted primarily by the lack of convenient radiative transition rate information for multi-electron systems. (Author)
AD-444 343 HC$3.00

A REVIEW OF SELECTED METHODS OF MACHINE MANIPULATION OF CHEMICAL STRUCTURES,
General Electric Co., Huntsville, Ala. Computer Dept.
For primary bibliographic entry see Field 5B.
AD-451 700 HC$3.00

UPPER LIMIT TO THE ELECTRIC-FIELD EFFECT ON THE NMR SPECTRUM OF NITROMETHANE,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
James D. Macomber, Norman S. Ham, and J. S. Waugh. 5 Dec 66, 1p
Contract DA-28-043-AMC-02536 (E)
Research supported in part by NSF.
Availability: Published in The Journal of Chemical Physics v46 n7 p2855-6 Apr 1 1967.

Descriptors: (* Organic nitrogen compounds, * Nuclear magnetic resonance), Microwave spectroscopy, Electric fields, Band spectrum, Modulation, Nuclear spins.
Identifiers: Nitromethanes.

The unsaturated slow-passage proton spectrum of nitromethane was examined at 56-4 MHz using a parallel plate cell. With no applied electric field, a splitting of the spectrum into a 1:2:1 triplet by modulation of the magnetic field gave a resolved structure for modulation frequency = or > 4 Hz. A potential difference of 5.0 kV applied across the cell with E parallel to H produced no visible change in the spectrum; the experimental upper limit of the effect is thus about 1/3 of the Lorentz cavity prediction of 11.3 Hz. Use of the Carr-Purcell spin-echo technique did not result in a lowering of the upper-limit on the electric field effect.
AD-655 203 Not available from CFSTI.

MEASUREMENT OF AMMONIA HYPERFINE STRUCTURE WITH A TWO-CAVITY MASER,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Stephen G. Kukolich. 5 Aug 66, 10p
Contract DA-36-039-AMC-03200 (E)
Availability: Published in The Physical Review v156 n1 p83-92 Apr 5 1967.

Descriptors: (* Microwave spectroscopy, Ammonia), (* Ammonia, Hyperfine structure), Spectrometers, Masers, Nitrogen, Hydrogen, Nuclear spins, Line spectrum, Electron transitions.

Hyperfine structure of the J-K=1-1,2-2,3-3, and 3-2 inversion transitions in N14H3 and the 1-1, 2-2, and 3-3 transitions in N15H3 was measured with a two-cavity maser spectrometer. This device employs Ramsey's method of separated oscillating fields to obtain a molecular resonance linewidth of 350 cps. The theory of Gunther-Mohr et al. and of Gordon was extended to include all terms off-diagonal in F1 is identical with IN+J in an attempt to explain some discrepancies between the previous theory and the measurements. The interactions included in this treatment are the nitrogen quadrupole interaction, the nitrogen IN.J interaction, the hydrogen I.J interaction, the hydrogen-nitrogen spin-spin interaction, and the hydrogen-hydrogen spin-spin interaction. The strengths of these interactions are treated as adjustable parameters in least-squares fit programs which determine the parameters by fitting the experimental data. There are still significant deviations between theory and experiment for the 1-1, 3-3, and 3-2 transitions of N14H3 and for 1-1, 2-2, and 3-3 transitions of N15H3. The largest discrepancies occur for the N14H33-2 transition and the 1-1, 2-2, and 3-3 transitions in N15H3 where the quadrupole interaction vanishes. The discrepancies are greater than 1 kHz in these cases. According to the theory, pairs of satellites of the N15H3 2-2 transition should occur at the same frequency, and these are all split by 4 kHz. In addition, the values of the N15H3 coupling parameters do not agree with theory. (Author)
AD-655 205 Not available from CFSTI.

CHEMICAL SHIFT NONEQUIVALENCE OF DIASTEREOTOPIC GROUPS IN SULFONIUM SALTS,
Princeton Univ N J Dept of Chemistry
Kiyosi Kondo, and Kurt Mislow. 25 Jan 67, 7p
AFOSR-67-1574
Grant AF-AFOSR-1188-67
Availability: Published in Tetrahedron Letters n14 p1325-8 1967.

Descriptors: (* Organic sulfur compounds, * Nuclear magnetic resonance), Molecular spectroscopy, Line spectrum, Solvents, Nuclear properties, Molecular isomerism.
Identifiers: Sulfonium compounds.

It was found that a number of sulfonium salts containing diastereotopic protons exhibit chemical shift nonequivalence. No examples of this kind had been previously reported. The nonequivalence is strongly solvent dependent. (Author)
AD-655 216 Not available from CFSTI.

ESR STUDY OF MANGANESE-DOPED ALPHA-ZINC SILICATE CRYSTALS,
Cornell Univ Ithaca N Y Baker Lab of Chemistry
For primary bibliographic entry see Field 20L.
AD-655 217 Not available from CFSTI.

HYPERPOLARIZABILITIES OF SOME POLAR DIATOMIC MOLECULES,
J. M. O'Hare, and R. P. Hurst. 19 Sep 66, 13p
AFOSR-67-1556
Grant AF-AFOSR-191-63
Availability: Published in The Journal of Chemical Physics v46 n6 p2356-66 Mar 15 1967.

Descriptors: (* Diatomic molecules, Polarization), (* Molecular orbitals, Dipole moments), Perturbation theory, Hartree-Fock approximation, Tensor analysis, Wave functions, Electric fields, Interactions, Electric moments, Lithium compounds, Hydrides, Hydrogen compounds, Boron compounds, Fluorides, Carbon monoxide, Fluorine, Lithium, Nitrogen.
Identifiers: Boron monofluoride, Hydrogen fluoride, Lithium hydride.

Theoretical results are presented for the dipole polarizability tensor, alpha-ij, and the first hyperpolarizability tensor, beta-ijk, for some diatomic molecules in a uniform electric field. The zero-order wavefunctions used in these calculations are extended basis Hartree-Fock functions of the Roothaan type. The values of alpha-ij and beta-ijk are obtained via an uncoupled Hartree-Fock scheme. The results for alpha-ij are compared with previous uncoupled and coupled self-consistent-field calculations. The present scheme improves upon the previous uncoupled calculations and compares favorably with the results obtained in self-consistent-field calculations. Finally, these polarizabilities and hyperpolarizabilities are found to be quite sensitive to the quality of the zero-order wavefunctions. (Author)
AD-655 220 Not available from CFSTI.

VOLTAMMETRIC STUDIES OF NON-AQUEOUS SYSTEMS.
TRW Systems Redondo Beach Calif
For primary bibliographic entry see Field 10C.
AD-655 271 HC$3.00 MF$0.65

MASS SPECTROMETRIC STUDY OF HOMOGENEOUS NUCLEATION IN FREE JETS.
Summary technical rept.,
Midwest Research Inst Kansas City Mo
Thomas A. Milne, and Frank T. Greene. 27 Jul 67, 12p
Contract Nonr-3599 (00)

Descriptors: (* Molecular beams, * Nucleation), (* Jets, Nucleation), Argon, Nitrogen oxides, Nitrogen, Oxygen, Carbon dioxide, Water vapor, Mercury, Lithium, Cesium compounds, Chlorides, Vapors, Mass spectrum, Molecular association.
Identifiers: Cesium chloride.

Free-jet expansions are being used to study the kinetics of the growth of clusters in highly supersaturated systems. A gas or gas mixture is expanded from high pressures into a vacuum to form a free jet, which is then collimated into a molecular beam and introduced into the ion source of a mass spectrometer. The gases Ar, NO, N2, O2, CO2 and H2O, as well as the higher temperature species Hg, CsCl and Li, were examined. Some of the observed phenomena may be explained by the postulation of metastable dimers. Generalizations were attempted about the kinetics of cluster growth and about the conditions under which nucleation is apt to be important in beam formation and molecular beam sampling. (Author)
AD-655 292 HC$3.00 MF$0.65

EVALUATION OF MOLECULAR WEIGHT FROM EQUILIBRIUM SEDIMENTATION. PART I. COMPUTATION BASED ON EXPERIMENTAL SCHLIEREN PLOT.
Summary rept. Jan 66-Feb 67,
Air Force Materials Lab Wright-Patterson AFB Ohio
Matatiahu Gehatia. Jun 67, 19p Rept no. AFML-TR-67-121-Pt-1

Descriptors: (* Molecular weight, Numerical analysis), (* Polymers, Molecular weight), Sedimentation, Diagrams, Equations, Diffusion, Concentration (Chemistry).

A new method has been developed to determine molecular weight (specifically, ratio g = s (omega sq.)/D, where omega = angular velocity, s = sedimentation coefficient, D = diffusion coefficient) from an experimental schlieren plot, dc/dr vs r, taken at equilibrium. By applying this method, one can determine the entire distribution of molecular weight from equilibrium sedimentation, as well as the average values.
AD-655 352 HC$3.00 MF$0.65

SUBCRITICAL LIQUID OXYGEN STORAGE AND SUPPLY SYSTEM FOR USE IN WEIGHTLESS ENVIRONMENTS.
Bendix Corp Davenport Iowa Pioneer-Central Div
For primary bibliographic entry see Field 22B.
AD-655 359 HC$3.00 MF$0.65

MASS SPECTROMETRIC DETECTION OF LABILE HYDRIDES FORMED BY ATOMIC HYDROGEN REACTIONS,
Aerospace Corp El Segundo Calif Labs Div
B. Siegel, and P. Breisacher. May 67, 30p Rept no. TR-1001 (2210-10)-3
SSD-TR-67-103
Contract AF 04 (695)-1001

Descriptors: (*Hydrides, *Mass spectroscopy), Hydrogen, Chemical reactions, Photochemistry, Vapors, Exploding wires.

The applicability of time-of-flight mass spectrometric techniques to the study of highly labile inorganic molecules is described, with emphasis on metal hydrides. The principal techniques used in this laboratory to generate such species for mass spectrometric study are mercury photosensitization, metal evaporations in hydrogen atmospheres, and electrical wire explosions. The apparatus is described and data are given for representative chemical systems for each of these methods of generating labile species. Finally, a brief survey is given of presently unknown hydride molecules that might prove amenable to study by these techniques. (Author)
AD-655 376 HC$3.00 MF$0.65

RESEARCH ON RELATIONS BETWEEN COMETARY, SOLAR AND UPPER ATMOSPHERIC PROCESSES.
Liege Univ (Belgium) Dept of Astrophysics
For primary bibliographic entry see Field 3B.
AD-655 385 HC$3.00 MF$0.65

INVESTIGATION OF INTERFEROMETRY FOR THE ANALYSIS OF ENCLOSED HABITABLE ATMOSPHERES.
Block Engineering Inc Cambridge Mass
For primary bibliographic entry see Field 6K.
AD-655 396 HC$3.00 MF$0.65

THIRD VIRIAL COEFFICIENT FOR AIR-WATER VAPOR MIXTURES,
Maryland Univ College Park Inst for Molecular Physics
R. W. Hyland, and E. A. Mason. 9 Jan 67, 9p
AROD-5366:8
Grant DA-ARO (D)-31-124-G617
Availability: Published in Journal of Research of the National Bureau of Standards-A. Physics and Chemistry v71A n3 p219-24 May-Jun 1967.

Descriptors: (*Air, Equations of state), (*Water vapor, Equations of state), (*Molecular association, Equations of state), Phase studies, Compressive properties, Interactions, Dipole moments, Vapors, Thermodynamics, Potential energy.
Identifiers: Interatomic potentials.

The third interaction virial coefficient Caww for air-water vapor mixtures is estimated in the temperature range 0 to 100C, by means of an approximate method based on molecular association. The results are believed accurate to within a factor of two. The value of Caww can be combined with previous estimates of the other interaction coefficient Caaw and the values of the third virial coefficients of pure air and pure water vapor, to give a quantitative description of the equation of state of air-water vapor mixtures through the complete third virial coefficient. It is shown that the maximum total contribution from both Caww and Caaw to the compressibility factor is only of the order of parts in 10,000 up to 100C and 100 atmospheres total pressure. At -50C, it can be shown by extrapolation of Caww that the contribution of the Caww term to the compressibility factor is only on the order of parts in 100 billion. (Author)
AD-655 410 Not available from CFSTI.

PHOTOGENERATION OF CHARGE CARRIERS IN ANTHRACENE,
New York Univ N Y Radiation and Solid State Lab
For primary bibliographic entry see Field 20L.
AD-655 411 Not available from CFSTI.

ELECTRIC CURRENTS IN ORGANIC CRYSTALS,
New York Univ N Y
For primary bibliographic entry see Field 7E.
AD-655 413 Not available from CFSTI.

THE MASS SPECTROMETRIC DETECTION OF DIMERS OF NITRIC OXIDE AND OTHER POLYATOMIC MOLECULES.
Summary technical rept.,
Midwest Research Inst Kansas City Mo
Thomas A. Milne, and Frank T. Greene. 24 Jul 67, 10p
Contract Nonr-3599 (00)

Descriptors: (*Polyatomic molecules, Molecular association), (*Nitrogen oxides, Molecular association), Molecular beams, Polymerization, Mass spectrum, Nitrogen, Oxygen, Carbon dioxide, Argon, Nucleation, Reaction kinetics, Chemical equilibrium.

Previous studies with Ar (see AD-637 177) have shown that the empirical extrapolation of the Ar dimer mole fraction to zero orifice size gives a value quite close to that obtained from equilibrium calculations. Such a result with Ar led to the hope that the other weakly interacting gases could be sampled at high pressures (where higher-cluster equilibria are favored), with extrapolation against orifice size being used to correct for nucleation effects during expansion. However, the polyatomic gases appear to behave quite differently. This behavior is discussed in terms of possible reasons for the low observed mole fractions of polyatomic dimer. The support that the NO results give for Fontijn and Rosner's postulate that clusters are involved in the anomalous (NO) x +O reaction rates is then briefly mentioned.
AD-655 454 HC$3.00 MF$0.65

ELECTRONIC SPECTRA OF AZA-AROMATICS IN POLYMER MATRICES.
Technical rept.,
California Univ Santa Barbara Dept of Chemistry
E. H. Park, A. H. Kadhim, and H. W. Offen. Jul 67, 27p Rept no. TR-4
Contract N00014-67-A-0120-0001
Prepared for publication in Spectrochimica acta.

Descriptors: (*N-heterocyclic compounds, Spectroscopy), (*Molecular spectroscopy, Embedding substances), Acridines, Azines, Oxides, Absorption spectrum, Fluorescence, Solvents, Polymers, Pressure, Plastics, Solid solutions.
Identifiers: Fluorescence spectrum, Matrix isolation techniques, Phenazine dioxides, Phenazines.

The absorption and fluorescence of acridine, phenazine, their cations, and phenazine-di-N-oxide were studied in polymer matrices. The correspondence to spectra in liquid or frozen solutions is established for the polymer matrices. The effect of the matrix and compression (0-27 kbar) on the spectral properties are compared. The extent of solid solvent perturbation on spectral location and bandwidth is illustrated for acridine and phenazine. The red shifts of the absorption and fluorescence band maxima are compared for two polymer matrices. The magnitude of the pressure response of the fluorescence bands and intensities differs for degassed and nondegassed plastic solutions. (Author)
AD-655 464 HC$3.00 MF$0.65

LIGHT DIFFRACTION BY ULTRASONIC SURFACE WAVES.
Georgetown Univ Washington D C Dept of Physics
For primary bibliographic entry see Field 20A.
AD-655 466 HC$3.00 MF$0.65

ENERGETIC IONS FROM N2 PRODUCED BY ELECTRON IMPACT,
Joint Inst for Lab Astrophysics Boulder Colo
L. J. Kieffer, and R. J. van Brunt. 1 Dec 66, 10p
AROD-4445:83-P
Contract DA-31-124-ARO (D)-139, ARPA Order-0492
Availability: Published in The Journal of Chemical Physics v46 n7 p2728-34 Apr 1 1967.

Descriptors: (*Nitrogen, *Gas ionization), Electron bombardment, Atomic energy levels, Excitation, Ionization potentials, Energy, Distribution.

Energy distributions, appearance potentials, and angular distributions of N (+) ions produced by electron impact on N2 were observed. The energy distribution and appearance potential of the N (++) ions from electron impact on N2 were also observed. The data are interpreted to give the abundance of the 'zero-energy' N (+) and the N (++) ions. The appearance-potential data for the 'zero-energy' N (+) ions disagree with previous measurements, and a possible interpretation indicates that the conclusion of previous investigators that no excited ions are produced may not be valid. (Author)
AD-655 477 Not available from CFSTI.

THE EFFECT OF RING SIZE ON THE RATE OF PYROLYSIS OF CYCLOALKYL PHENYL SULFOXIDES,
Oregon State Univ Corvallis Dept of Chemistry
For primary bibliographic entry see Field 7C.
AD-655 482 Not available from CFSTI.

FERROELECTRICITY,
California Univ San Diego La Jolla
For primary bibliographic entry see Field 20C.
AD-655 483 Not available from CFSTI.

MAGNETIC SUSCEPTIBILITY OF URANIUM TRIFLUORIDE IN THE RANGE 2-300K,
Cornell Univ Ithaca N Y Baker Lab of Chemistry
Michael Berger, and M. J. Sienko. 6 Sep 66, 6p
AFOSR-67-1608
Grant AF-AFOSR-796-65
Availability: Published in Inorganic Chemistry v6 p324-6 1967.

Descriptors: (*Uranium compounds, Magnetic properties), Fluorides, Cryogenics, Magnetic moments, Atomic orbitals, Nuclear spins, Band theory of solids, Chlorides, Bromides.
Identifiers: Curie-Weiss law, Magnetic susceptibility, Uranium trifluoride.

The magnetic susceptibility of UF3 was measured by the Gouy method over the temperature range 1.9-300K. Behavior follows the Curie-Weiss law Chi = C/ (T - theta) with theta = -1 10 +5 or -5 deg. The effective moment is 3.67 +0.06 or = 0.06 BM, corresponding closely to a 5f3 configuration. There is no sign of a Neel inversion even at the lowest temperature reached. Comparison of data for UF3, UCl3, and UBr3 suggests that the ratio of spin-orbit coupling to ligand-field splitting increases in the order UF3, UCl3, UBr3. (Author)
AD-655 517 Not available from CFSTI.

ELECTROCHEMICAL DATA ACQUISITION AND ANALYSIS SYSTEM BASED ON A DIGITAL COMPUTER.
Revised ed.,
California Inst of Tech Pasadena Gates and Crellin Labs of Chemistry
George Lauer, Roger Abel, and Fred C. Anson.
30 Mar 67, 8p Rept no. Contrib-3473
AROD-3406:19
Contract DA-31-124-ARO (D)-102
Revision of manuscript submitted 1 Feb 67.
Availability: Published in Analytical Chemistry v39 p765-9 Jun 1967.

Descriptors: (*Electrochemistry, *Data storage systems), (*Programming (Computers), *Digital computers), Real time, Clocks, Automation, Laboratories, Functional analysis, Costs.

A system is described in which a small digital computer is programmed to initiate an electrical experiment, to acquire, digitize, and store electrochemical data, to test for completion of a run, and to perform a functional analysis on the stored data. Experiments are described whereby the apparatus was used to study adsorbed reactants by the chronocoulometric technique. Examples are given of other electrochemical experiments in which the computer-based system will afford major improvements in the quality of data acquired and in the speed of data reduction.
AD-655 541 Not available from CFSTI.

ABSOLUTE INFRARED INTENSITIES OF THE FUNDAMENTAL ABSORPTION BANDS IN SOLID CCl4,
Iowa Univ Iowa City Dept of Chemistry
C. F. Cook, W. B. Person, and L. C. Hall. 19 Jul 66, 13p
AROD-1733:26
Grant DA-ARO (D)-31-124-G387
Availability: Published in Spectrochimica Acta v23A p1425-33 1967.

Descriptors: (*Solidified gases, Carbon tetrachloride), (*Carbon tetrachloride, Infrared spectroscopy), Absorption spectrum, Band spectrum, Intensity, Chemical bonds, Isotopes.

The absolute infrared absorption intensities of the two active fundamental vibrations of CCl4 were measured for the solid at -170C. The thickness was determined by interference fringes. Intensity measurements are also reported for nu-4 in the gas and liquid phases. The strong C-Cl stretching vibration, nu-3, in Fermi resonance with nu-1 + nu-4, has an intensity in the solid of 45.3 plus or minus 6.5 kdarks, almost the same as in the liquid state, but somewhat higher than in the gas phase. An increase in intensity from the gas phase is also observed for the weak bending mode, nu-4, which has an intensity of 0.08 plus or minus 0.02 kdarks in the solid state. These values suggest that the CCl4 solid shows approximately 'ideal' behavior, as judged by the infrared intensities, since they are predicted fairly well from the gas phase intensities by the field effect. In an attempt to display infrared intensity data from condensed phase in a more meaningful way, the 'delocalisation moment' is defined and the results for CCl4 and for some linear triatomic molecules are presented. (Author)
AD-655 552 Not available from CFSTI.

IRON AND IRON-CHROMIUM ALLOY SILICA REACTION STUDIES.
Dartmouth Coll Hanover N H Thayer School of Engineering
For primary bibliographic entry see Field 11F.
AD-655 584 HC$3.00 MF$0.65

OXIDATION AND CHEMILUMINESCENCE OF TETRAKIS (DIMETHYLAMINO)ETHYLENE. III. KINETICS, QUANTUM YIELD, AND MECHANISM OF LUMINESCENCE,
Naval Ordnance Test Station China Lake Calif
For primary bibliographic entry see Field 7E.
AD-655 614 Not available from CFSTI.

ELECTROCHEMICALLY ACTIVE, FIELD-TRAINABLE PATTERN RECOGNITION SYSTEMS.
Space-General Corp Los Angeles Calif Center for Research and Education
For primary bibliographic entry see Field 6D.
AD-655 650 HC$3.00 MF$0.65

DICARBOXYLIC ACID-UREA COMPLEXES,
Frankford Arsenal Philadelphia Pa Pitman-Dunn Research Labs
For primary bibliographic entry see Field 7C.
AD-655 677 Not available from CFSTI.

ON THE INTERPRETATION OF THE FACTOR GROUP SPLITTING IN NAPHTHALENE CRYSTAL,
Chicago Univ Ill Inst for the Study of Metals
For primary bibliographic entry see Field 20L.
AD-655 720 Not availab from CFSTI.

OPEN-SHELL HARTREE-FOCK MOLECULAR ORBITAL THEORY OF TRANSITION METAL ION COMPLEXES: KNiF,
Massachusetts Inst of Tech Cambridge National Magnet Lab
D. E. Ellis, A. J. Freeman, and P. Ros. 1967, 2p
AFOSR-67-1633
Contract F44620-67-C-0047
Prepared in cooperation with Florida Univ., Gainesville, Fla.
Availability: Published in Journal of Applied Physics v38 n3 p1051 Mar 1 1967.

Descriptors: (*Complex compounds, *Molecular orbitals), (*Nickel compounds, Molecular orbitals), Potassium compounds, Fluorine compounds, Hartree-Fock approximation.
Identifiers: Potassium trifluoronickelate.

The document is comprised of an abstract of a paper concerning an open shell single determinant Hartree-Fock SCF molecular orbital method for transition ion complexes and its application to potassium trifluoronickelate (II).
AD-655 723 Not available from CFSTI.

ON THE AlB2 TYPE PHASES,
Texas Univ Austin Dept of Chemical Engineering
For primary bibliographic entry see Field 20B.
AD-655 743 Not available from CFSTI.

INFLUENCE OF ELECTRIC FIELDS ON THE MOLECULAR ALIGNMENT IN THE LIQUID-CRYSTAL para-AZOXYANISOLE,
Maine Univ Orono Dept of Physics
Roger P. Twitchell, and E. F. Carr. 22 Aug 66, 5p
AFOSR-67-1698
Grant AF-AFOSR-605-64
Availability: Published in The Journal of Chemical Physics, v46 n7 p2765-8 1 Apr 1967.

Descriptors: (*Crystals, Liquids), (*Organic nitrogen compounds, Molecular properties), (*Phenyl ethers, Molecular properties), Electric fields, Magnetic fields, Audiofrequency, Microwave frequency, Dielectric properties, Alignment.
Identifiers: Azoxy anisole, Liquid crystals.

The molecular alignment in the liquid crystal p-azoxyanisole due to external static magnetic fields and audio-frequency electric fields was studied by measuring the dielectric loss at a microwave frequency. For a 500-Hz electric field the long axes of the molecules preferred a direction parallel to the field which is usually observed but not predicted from theoretical considerations. The degree of alignment in a high 500-Hz electric field was less than in a high magnetic field and depended on the frequency of the electric field. The effectiveness of electric fields in aligning the molecules was compared to that of magnetic fields by applying the fields simultaneously and at right angles to each other. The results provide support for an explanation of the molecular alignment at audio frequencies, which was suggested earlier (see AD-641 784). (Author)
AD-655 754 Not available from CFSTI.

CHEMISORPTION OF CARBON MONOXIDE ON MOLYBDENUM,
Vermont Univ Burlington Dept of Physics
A. D. Crowell, and Lee D. Matthews. 30 Jan 67, 13p
AFOSR-67-1695
Grant AF-AFOSR-993-66
Availability: Published in Surface Science v7 p79-89 1967.

Descriptors: (*Carbon monoxide, *Chemisorption), (*Molybdenum, Chemisorption), Surface properties, Crystals, Tracer studies, Chemical bonds, Heat of activation.
Identifiers: Desorption, Surface chemistry.

The chemisorption of carbon monoxide on polycrystalline molybdenum was studied using a radiotracer technique. Following outgassing at temperatures of 1500-2000K in an ultrahigh vacuum system, carbon monoxide tagged with carbon-14 was admitted to pressures in the 0.00000001 to 0.00001 Torr range. Rates of adsorption were consistent with sticking coefficients in the range of 0.001 to 0.1. Desorption at various temperatures was observed as a function of time, and the data are interpreted in terms of a set of several binding states corresponding to desorption energies of 3.24 +0.03 or -0.03, 3.41 +0.03 or -0.03, 3.61 +0.02 or -0.02, 3.77 +0.03 or -0.03 and 3.95 +0.02 or -0.02 eV. The relative population of these states at saturated coverage was also determined, and the differential energy of desorption as a function of coverage and temperature has been calculated. (Author)
AD-655 755 Not available from CFSTI.

SELF MODULATING, DERIVATIVE OPTICAL SPECTROSCOPY. PART II. EXPERIMENTAL,
National Electrotechnical Inst Turin (Italy)
For primary bibliographic entry see Field 14B.
AD-655 758 Not available from CFSTI.

ELASTIC SCATTERING OF LOW-ENERGY ELECTRONS FROM MOLECULAR HYDROGEN,
Aerospace Corp El Segundo Calif Labs Div
Roger L. Wilkins, and Howard S. Taylor. Jun 67, 35p Rept no. TR-1001 (2240-20)-14
SSD-TR-67-112
Contract AF 04 (695)-1001
Prepared in cooperation with University of Southern California, Los Angeles.

Descriptors: (*Hydrogen, Electron bombardment), (*Electrons, *Elastic scattering), Interactions, Probability, Diatomic molecules, Hartree-Fock approximation, Exchange reactions, Molecular orbitals, Wave functions, Integral equations, Iterative methods.

The cross sections for elastic scattering of low energy electrons by molecular hydrogen are calculated by solving numerically the continuum Hartree-Fock equations for an electron moving in the potential field of the neutral homonuclear diatomic hydrogen molecule. Hartree-Fock equations make full allowance for electron exchange. The cross sections for elastic scattering of electrons by molecular hydrogen are treated with and without the assumption of electron exchange. The theoretical agreement in the exchange approximation is very good when compared with experimental data, but disappears completely when exchange is neglected. The method of calculation is based on an expansion of the continuum orbitals up to fourth order as a product of a series of spherical harmonics and radial wave functions about the molecular midpoint of the molecule. The potential field of the incident electron caused by the nuclei of the neutral molecule is expanded in spherical harmonics up to the eighth order. The continuum orbitals are substituted into the Hartree-Fock equations, integration is performed over angular coordinates, and the resulting infinite set of coupled differential-integral equations is truncated and solved numerically to a self-consistent solution by an iterative technique for three radial continuum functions. (Author)
AD-655 785 HC$3.00 MF$0.65

HIGH RESOLUTION STUDIES IN THE FAR INFRARED.
Final rept.,
Johns Hopkins Univ Baltimore Md Dept of Chemistry
Dean W. Robinson. Jun 67, 12p
AFOSR-67-1607
Contract AF 49 (638)-1430

Descriptors: (*Infrared spectroscopy, *Cryogenics), Solidified gases, Crystals, Solid solutions, Furans, Helium group gases, Instrumentation.
Identifiers: Matrix isolation techniques.

A study was made of the far infrared spectra at liquid helium temperatures. At low temperatures rotational modes of vibrations become librational. A spherical environment was produced by condensing water and hydrogen fluoride in rare gas matrices. Pure crystals of polyatomic molecules such as hydrogen sulfide and iodide were studied. Solid solutions of water and deuterium oxide in rare gases were studied. Marked improvements were accomplished in a far infrared detector which operates at 1.5 Kelvin and in the construction of a low temperature infrared cell. (Author)
AD-655 799 HC$3.00 MF$0.65

NOZZLE FLOW OF A CHEMICALLY REACTING AND RADIATING IONIZED GAS.
Massachusetts Inst of Tech Cambridge Aerophysics Lab
For primary bibliographic entry see Field 20I.
AD-655 836 HC$3.00 MF$0.65

THE THERMAL REACTION BATTERY ELECTROLYTES FROM THE PYROLYSIS OF OXIME DERIVATIVES,
Harry Diamond Labs Washington D C
For primary bibliographic entry see Field 10C.
AD-655 843 HC$3.00 MF$0.65

CONTRIBUTION TO THE THEORY OF FLOWS INCLUDING CHEMICAL REACTIONS.
France. Office National D Etudes Et de Recherches Aeronautiques, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 17.
N67-30553 HC$3.00 MF$0.65

THIRTY YEAR SPECTRUM ATLAS OF THE ASTROPHYSICAL LABORATORY OF THE VATICAN OBSERVATORY.
Dreissig Jahre Spektralatlanten des Astrophysikalischen Laboratoriums Der Vatikanischen Sternwarte
Specola Vaticana (Vatican City). Laboratorio Astrofisico.
J. Junkes, and E. W. Salpeter. 1966, 96p
City/, V. 3, No. 3, 1966 P 65-162 Refs in German, English Summary

Descriptors: *Bibliography, *Iron, *Metal oxide, *Spectral line, *Thorium, Arc, Atom, Band, Grating, Line, Metal, Oxide, Spark, Spectrum, Ultraviolet, Vacuum.

For abstract, see STAR 05 17.
N67-30698 HC$3.00 MF$0.65

REPORT FROM THE INTERNATIONAL SUMMER INSTITUTE IN QUANTUM CHEMISTRY, SOLID-STATE PHYSICS, AND QUANTUM BIOLOGY HELD AT THE UNIVERSITY OF UPPSALA, UPPSALA, SWEDEN.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
For primary bibliographic entry see Field 20J.
For abstract, see STAR 05 17.
N67-30746 HC$3.00 MF$0.65

ON THE DETERMINATION OF THE ELECTRON SPECTRA OF PI ELECTRON SYSTEMS BY THE MIM PROCESS.
Ueber Die Berechnung Der Elektronenspektren Von Pi-elektronen-systemen Nach Dem Mim-verfahren
Eidgenossische Technische Hochschule, Zurich (Switzerland).
P. A. Straub. 1966, 95p DISS-3843
in German

Descriptors: *Electron spectrum, *Matrix algebra, *Molecular electronics, Algebra, Analysis, Atom, Calculation, Computer, Electron, Electronics, Large, Matrix, Model, Molecular, Physics, Spectrum, System, Theoretical, Value.

For abstract, see STAR 05 17.
N67-30758 HC$3.00 MF$0.65

APPROXIMATE NATURAL ORBITALS FOR CARBON 1S.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
V. H. Smith, Jr.. 30 Nov 66, 10p
Contract AF 61/052/-874
Its Preprint No. 178

Descriptors: *Carbon, *Electron state, *Orbital calculation, *Wave function, Calculation, Density, Eigenvalue, Electron, Function, Matrix, Mechanics, Number, Occupation, Orbital, Particle, Quantum, Spin, State, Wave.

For abstract, see STAR 05 17.
N67-31103 HC$3.00 MF$0.65

NATURAL SPIN ORBITALS FOR SOME LITHIUM WAVEFUNCTIONS CONTAINING EXPLICITLY INTERELECTRONIC COORDINATES.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
S. Larsson, and V. H. Smith, Jr.. 31 Jan 67, 27p
Contract AF 61/052/-874
Its Preprint No. 186

Descriptors: *Hartree-fock calculation, *Lithium, *Spin-orbit interaction, Atom, Calculation, Density, Helium, Interaction, Natural, Orbit, Spin, Structure, Wave function.

For abstract, see STAR 05 17.
N67-31228 HC$3.00 MF$0.65

OXIDATION POTENTIALS FOR SOME TRANSITION ELEMENTS.
Carnegie Inst. of Tech., Pittsburgh, Pa. National Bureau of Standards, Washington, D. C. Dept. of Chemistry.
L. G. Hepler. Jul 67, 17p NASA-CR-85811
NASA ORDER R-09-022-029
Prepared for Nbs

Descriptors: *Oxidation, *Table, *Transition element, Algebra, Chemical, Electric, Electrode, Element, Equilibrium, Reaction, Sign, Thermodynamics, Transition.

For abstract, see STAR 05 17.
N67-31287 HC$3.00 MF$0.65

MOLECULAR ORBITALS AND INNER SHELL CHEMICAL SHIFTS FOR SULFUR AND CHLORINE OXY- ANIONS.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
R. Manne. 1 Nov 66, 28p
Contract AF 61/052/-874
Its Preprint No. 180

Descriptors: *Anion, *Chlorine oxide, *Electronic structure, *Molecular orbit, *Sulfur oxide, Charge, Chlorine, Core, Distribution, Electronic, Emission, Molecular, Orbit, Oxide, Resonance, Spectroscopy, Spin, Structure, Sulfur, Valence, X-ray.

For abstract, see STAR 05 17.
N67-31437 HC$3.00 MF$0.65

QUANTUM MECHANICAL CALCULATIONS OF REACTIVE SCATTERING CROSS-SECTIONS IN BIMOLECULAR ENCOUNTERS.
Georgia Inst. of Tech., Atlanta.
J. C. Pirkle, Jr.. Apr 67, 230p NASA-CR-85838
Contract NAS8-11242

Descriptors: *Bromine, *Gas-gas interaction, *Hydrogen, *Quantum mechanics, Calculation, Cross, Exchange, Gas, Interaction, Mechanics, Molecule, Phase, Quantum, Rate, Reaction, Section.

For abstract, see STAR 05 17.
N67-31451 HC$3.00 MF$0.65

13CS2 SYNTHESIS FOR CARBON-13 NMR FIELD-FREQUENCY LOCK.
California Univ., Davis. Dept. of Chemistry.
For primary bibliographic entry see Field 7B.
PB-174 917 HC$3.00 MF$0.65

ELECTRICAL MEASUREMENTS: CONTRIBUTED PAPERS AND DISCUSSION,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
For primary bibliographic entry see Field 14B.
PB-175 620 HC$3.00 MF$0.65

7E. Radio and Radiation Chemistry

A MODEL FOR ATOMIC EXCITED STATES. II. EIGENVALUES AND EIGENFUNCTIONS.
Technical rept.,
Cornell Univ., Ithaca, N. Y. Dept. of Physics.
E. J. McGuire. Jul 65, 35p TR-7A
AROD-2810:18
Contract DA-31-124-ARO (D)-43

Descriptors: (*Atomic energy levels, Excitation), Functions, Differential equations, Electrons, Atomic orbitals, Electron transitions, Quantum mechanics, Wave functions, Boundary value problems, Atomic spectroscopy, X-ray spectroscopy, Mathematical models, Photochemistry, X rays, Mathematical models.

A model for one electron excited states is described which can be used in calculations of atomic photoabsorption processes in the soft x-ray region. (Author)
AD-477 668 HC$3.00 MF$0.65

MODIFIED CHROMATOGRAPHIC TECHNIQUE FOR DETECTION OF FLUORESCENT IMPURITIES IN ANTHANTHRENE.
Revised ed.,
New York Univ N Y Radiation and Solid State Lab
V. S. Shevade. 10 Jan 67, 4p
AROD-4542:4
Contract DA-31-124-ARO (D)-448, ARPA Order-0462
Revision of manuscript submitted 18 Nov 66.
Availability: Published in Analytical Chemistry v39 p408-9 Mar 1967.

Descriptors: (*Polycyclic compounds, *Chromatographic analysis), (*Fluorescence, Chromatographic analysis), Impurities, Photochemistry, Thin layer chromatography, Sensitivity.
Identifiers: Anthanthrenes.

While attempting purification of anthanthrene to be used in measurements of electrical conductivity, a very sensitive technique was developed for detection of fluorescent impurities. A large number of investigations have been carried out recently for separation and identification of polycyclic aromatic hydrocarbons on thin layers of silica gel, aluminum, oxide, kieselgel G, and acetylated cellulose, but photochemical changes occur when the chromatogram is exposed to daylight or ultraviolet light even for brief periods. It was found that these photochemical changes are prevented by removing the solvent from the developed chromatogram in the dark under vacuum prior to its being sprayed with aqueous dispersions of a polymer, and by exposing the chromatogram to ambient light only when it is dry. The protective polymeric coating enhances the fluorescence of the impurities. (Author)
AD-655 304 Not available from CFSTI.

KINETIC AND SPECTROSCOPIC CONSTRAINTS ON THE ORIGIN OF THE N2 AFTERGLOW,
Aerospace Corp El Segundo Calif Labs Div
S. W. Benson. Apr 67, 15p Rept no. TR-1001 (2240-20)-16
SSD-TR-67-114
Contract AF 04 (695)-1001

Descriptors: (*Nitrogen, *Afterglows), (*Chemiluminescence, Nitrogen), Molecular energy levels, Electron transitions, Molecular spectroscopy, Reaction kinetics, Dissociation, Chemical equilibrium, Band spectrum, Quenching (Inhibition).

The large transition probability (1/10 to 1/100) for curve crossing such as occurs in N2 predissociation N2 (3B) = N2 (5-Sigma) guarantees that the rotationally 'hot' members of the 12th vibrational level of the B state (3B (12))* will always be in 'equilibrium' with free N atoms without the intervention of a third body. A kinetic scheme is suggested for these species that includes rotational and vibrational quenching in competition with electronic quenching. Fast rotational quenching gives rise to pseudo-equilibrium population of normal 3B (12) species. The equilibrium constant for 2N = N2 (3B (12)) KB is estimated at 10 to the -1.8th power liter/mole = 10 to the -22.6 power cc/particle at 300K with a negative activation energy of -2.2 kcal/mole, in good accord with recent data. Using 100000/sec as the measured radiative lifetime of the 12-8 transition yields an absolute emission intensity for this band of 10 to the 3.2 power liter/mole-sec = 10 to the -17.6 power cc/molecule-sec, again in good accord with observation. It appears from this that the 11th, 10th, and 9th vibrational levels are populated by successive collisional deactivation of the 12th level. This collisional deactivation is in competition with electronic quenching. (Author)
AD-655 378 HC$3.00 MF$0.65

PHOTOGENERATION OF CHARGE CARRIERS IN ANTHRACENE,
New York Univ N Y Radiation and Solid State Lab
For primary bibliographic entry see Field 20L.
AD-655 411 Not available from CFSTI.

ELECTRIC CURRENTS IN ORGANIC CRYSTALS,
New York Univ N Y
Martin Pope. 1967, 15p
AROD-4542:8
Contract DA-31-124-ARO (D)-448, ARPA Order-0462
Availability: Published in Scientific American v216 n1 p86-97 Jan 1967.

Descriptors: (*Polycyclic compounds, *Carriers (Semiconductors)), (*Photoconductivity, Polycyclic compounds), (*Excitons, Organic materials), Molecular energy levels, Anthracenes, Test methods, Photoelectric effect, Carriers (Semiconductors), Band theory of solids, Crystals.
Identifiers: Naphthacenes.

If a negatively charged organic crystal is suspended midway betweentwo charged plates (in an inert atmosphere), it will begin to fall when exposed to light of a particular frequency - indicating a loss of some negative charge due to photoelectric emission. This technique, capable of measuring currents as low as 10 to the -20th power ampere, provides a very sensitive new means of determining molecular energy levels and of probing the basic mechanisms of charge transfer in organic crystals. A semi-technical account is given of a number of such studies involving anthracene and tetracene (naphthacene) crystals. Particular attention is given to an explanation of the exciton concept of charge generation. The studies recounted include those involving a test of a theory of one type of photoconductivity, the measurement of energy liberated by double-quanta ejection of an electron, and the determination of the energy levels of anthracene and tetracene in each of seven ionized states. Certain aspects of this work are reported in greater technical detail in AD-644 239, AD-644 240, and AD-652 303.
AD-655 413 Not available from CFSTI.

TWO-PHOTON ABSORPTION IN ANTHRACENE.
Doctoral thesis,
Rochester Univ N Y Inst of Optics
John P. Hernandez, and Albert Gold. 10 Oct 66, 13p
AROD-5314:4
Contract DA-31-124-ARO (D)-306
Availability: Published in The Physical Review v156 n1 p26-35 Apr 5 1967.

Descriptors: (*Anthracenes, Photochemistry), (*Excitons, Anthracenes), Molecular orbitals, Wave functions, Molecular energy levels, Polarization, Band theory of solids, Electron transitions, Photons, Absorption.

Two-photon transition rates for molecular and crystalline anthracene are calculated using Pariser's pi-electron molecular-orbital wave functions, including configuration interaction. Distinctive polarization dependences and approximate rates are obtained for the 4.94-eV B1g and 5.00-eV A1g molecular states. Frenkel exciton states built from the B1g state are found to be sufficiently red-shifted to account for the absorption observed in the solid. The levels found at 3.48 and 3.58 eV by Frohlich and Mahr are tentatively identified as the Bg and Ag components, respectively, of the resulting Davydov doublet. Polarization dependences are consistent with available data, and the calculated rate is of reasonable magnitude. An A1g-derived doublet is predicted near 4.8 eV. (Author)
AD-655 542 Not available from CFSTI.

OXIDATION AND CHEMILUMINESCENCE OF TETRAKIS (DIMETHYLAMINO)ETHYLENE. III. KINETICS, QUANTUM YIELD, AND MECHANISM OF LUMINESCENCE,
Naval Ordnance Test Station China Lake Calif
Aaron N. Fletcher, and Carl A. Heller. 11 Jul 66, 23p Rept no. NOTS-TP-4383
NAVWEPS-9015-Pt-3
See also AD-648 821.
Availability: Published in Journal of Physical Chemistry v71 n5 p1507-18 Apr 1967.

Descriptors: (*Chemiluminescence, Amines), (*Amines, Reaction kinetics), Oxidation, Ethylenes, Emissivity, Decomposition, Spectroscopy, Thermochemistry, Molecular energy levels, Continuous spectrum.
Identifiers: Auto-oxidation, Quantum yield, Tetrakis (dimethylamino)ethylenes

The kinetics for the chemiluminescence from the autoxidation of tetrakis (dimethylamino)ethylene (TMAE) was measured. An equation giving absolute light output was obtained. The chemiluminescent decompositicn of an intermediate of the oxidation was also measured. Spectra, photoluminescent efficiency, and thermochemical data are given. A mechanism is proposed which covers both oxidation and chemiluminescent kinetics. Part of this mechanism is a reaction producing electronically excited TMAE. (Author)
AD-655 614 Not available from CFSTI.

MOLECULAR PHOTOCHEMISTRY,
Columbia Univ New York Dept of Chemistry
Nicholas J. Turro. 1967, 15p
AFOSR-67-1672
Grant AF-AFOSR-1000-66
Availability: Published in Chemical and Engineering News p84-95 May 8 1967.

Descriptors: (*Photochemistry, Reviews), Molecular energy levels, Excitation, Stereochemistry, Ketones, Molecular orbitals, Dienes, Synthesis (Chemistry), Chemical industry.

Molecular photochemistry is providing fundamental and useful information about the chemistry of excited states. The role of photochemistry as a synthesis tool for the chemical industry is clear-cut in the case of fine chemicals, in that photoreactions can often offer the cheapest, shortest routes. On a larger scale its role is not yet clear, although a plant to produce 20 million pounds a year of nylon 6 monomer (caprolactam) by the photonitrosylation of cyclohexane has been built by the Japanese. Many 'new' photoreactions will continue to appear in the literature, but the number of new primary processes will probably continue to be small. Intelligent exploitation of photochemistry will be hampered until useful quantitative reactivity relationships and lifetime data for a wide variety of organic molecules are available. Although such information has been slow in coming, this is a fertile area for future research. (Author)
AD-655 730 Not available from CFSTI.

THE PREPARATION AND PURIFICATION OF CELLOBIOSE-1-C14.
Research note,
Forest Products Lab., Madison, Wis.
Milton S. Feather, and John F. Harris. Jun 67, 6p
FPL-0168
Prepared in cooperation with Wisconsin Univ., Madison.

Descriptors: (*Labeled substances, Preparation), (*Carbohydrates, Labeled substances), Glucose, Synthesis (Chemistry), Radiation chemistry, Purification, Chromatographic analysis, Cellulose, Decomposition, Tracer studies.
Identifiers: Cellobiose.

Cellobiose, a sugar representative of the simplest repeating unit of cellulose, is of considerable value as a model compound and has frequently been used to study the degradation of carbohydrates in pulping processes. Radiochemically labeled cellobiose is useful in distinguishing the reactions of one end of the molecule from those of the other end and mechanistic studies such as saccharinic acid formation and oxidation reactions in alkaline solution. The report describes the chemical synthesis of isotopically labeled cellobiose, 4-0- (Beta-D-glucopyranosyl)-D-glucose-1-C14 (cellobiose-1-C14). This was synthesized by a series of chemical reactions using inert cellobiose as the starting compound, and was obtained in over 98.0 percent radiochemical purity by chromatographic purification of the acetylated crude material obtained in the synthesis. (Author)
PB-175 558 HC$3.00 MF$0.65

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

HANDBOOK OF OCEANOGRAPHIC TABLES.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 8C.
AD-655 638 MF$0.65

INTERNAL BEHAVIOR IN FISH SCHOOLS,
Cornell Univ Ithaca N Y
William N. McFarland, and Sanford A. Moss. 27 Jan 67, 4p
Contract Nonr-401 (52)
Prepared in cooperation with Yale Univ., New Haven, Conn., Dept. of Biology.
Availability: Published in Science v156 n3772 p260-2 Apr 14 1967.

Descriptors: (*Fishes, Ecology), (*Marine biology, Fishes), Behavior, Environment, Metabolism, Oxygen, pH, Density, Adaptation (Physiology).

Structural changes within fish schools correlate with declines in environmental oxygen. The changes may result from the responses of individual fish to the environmental consequences of group metabolism. Individual behaviors are adaptive to the school in that they tend to maintain stability between school members and their environment. (Author)
AD-655 694 Not available from CFSTI.

CENOZOIC OROSPHAERID RADIOLARIANS FROM TROPICAL PACIFIC SEDIMENTS,
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8G.
AD-655 714 Not available from CFSTI.

LATE TERTIARY BIOSTRATIGRAPHY (PLANKTONIC FORAMINIFERA) OF TROPICAL INDO-PACIFIC DEEP-SEA CORES,
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8G.
AD-655 715 Not available from CFSTI.

8B. Cartography

PRODUCTION CONTROL IN CARTOGRAPHY.
Technical paper,
Aeronautical Chart and Information Center, St. Louis, Mo.
Froman Hulbert, and Sidney E. Tischler. Apr 66, 27p ACIC-TP-13
Revision of manuscript submitted Feb 64.

Descriptors: (*Mapping, Production control), (*Maps, Air Force research), Quality control, Curve fitting, Scheduling, Management planning, Management control systems, Manpower studies, Hydrology, Terrain.

Production control objectives in a manufacturing establishment presume a certain degree of reliability in production estimating. Where product mix is highly complex and schedules must be compatible with military plans and operations, the need for an estimating tool is fundamental. The regression technique is such a tool. Methods of applying it to the cartographic manufacturing process are described and evaluated. (Author)
AD-489 131 HC$3.00 MF$0.65

THE STRUCTURE OF POLYNOMIAL AND FOURIER COEFFICIENT MATRICES.
Technical rept.,
Northwestern Univ Evanston Ill Dept of Geology
W. C. Krumbein. Jun 67, 9p Rept no. TR-5-Pt-1
Contract Nonr-1228 (36)
Presented at a meeting on Computer Applications in the Earth Sciences: Colloquium on Classification Procedures, Computer Contribution-7, held at Kansas Univ. Sponsored by the Kansas Geological Survey.

Descriptors: (*Mapping, Mathematical models), (*Maps, Surfaces), Matrix algebra, Geology, Polynomials, Beaches, Mathematical analysis.

Current methods of trend analysis utilize mainly the polynomial and Fourier models, both of which are derived from the general linear model. The coefficient matrices associated with the map models are conventionally structured diagonally for polynomials and in blocks for Fourier surfaces. It is possible, however, to consider the elements of such matrices as occupying points in a 'coefficient space' defined by coordinate axes representing the coefficient subscripts. This space may be subdivided in various ways to yield configurations by diagonals, blocks, circles, hyperbolas, etc. Each of these classifications gives rise to a set of ranked map surfaces (sequential or cumulative) that can be used with both map models for expressing and analyzing map data in different ways, and for screening out selected components for map comparisons. (Author)
AD-655 445 HC$3.00 MF$0.65

THE GENERAL LINEAR MODEL IN MAP PREPARATION AND ANALYSIS, PART II.
Technical rept.,
Northwestern Univ Evanston Ill Dept of Geology
W. C. Krumbein. Jun 67, 11p Rept no. TR-5-Pt-2
Contract Nonr-1228 (36)
Presented at a meeting on Computer Applications in the Earth Sciences: Colloquium on Trend Analysis, Computer Contribution-12, held at Kansas Univ. Sponsored by the Kansas Geological Survey.

Descriptors: (*Mapping, Mathematical models), (*Maps, Surfaces), Matrix algebra, Analysis, Random variables, Beaches, Mathematical analysis.

The general linear model is the connecting thread that weaves through many aspects of map preparation, map analysis, and map interpretation. The Q-mode factor map and the discriminant function map are examples. The general linear model is also the basis for polynomial and Fourier map-analysis models, both of which are widely used in a variety of geological fields. Coefficient space, developed in AD-655 445, is further examined here, and the extension of map analysis to the estimation of 'trends' in coefficient matrices is introduced with an example. (Author)
AD-655 446 HC$3.00 MF$0.65

WORLD MAPS OF CONJUGATE COORDINATES AND L CONTOURS,
Institute for Telecommunication Sciences and Aeronomy Boulder Colo
For primary bibliographic entry see Field 4A.
AD-655 661 Not available from CFSTI.

AN EXPERIMENT WITH THE CONSTRUCTION OF A GEOMAGNETIC MAP FROM DATA OF AN ARTIFICIAL EARTH SATELLITE.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
N. V. Adam, N. P. Benkova, and L. O. Tyurmina. 1967, 11p
ACIC-TC-1240, TT-67-62384
Opyt Postroeniya Geomagnitnoi Karty po Dannym ISZ, trans. of Kosmicheskie Issledovaniya (USSR) v4 n3 p463-8 1966.

Descriptors: (*Satellites (Artificial), *Mapping), (*Maps, *Terrestrial magnetism), Magnetic fields, Intensity, USSR, Earth (Planet), Harmonic analysis, Narrowband, Altitude.

Presented is a map of the total intensity of the magnetic field above the territory of the USSR, constructed from measurements taken by the third artificial earth satellite. For the reduction to a single altitude (400 km is the altitude at which most measurements were taken) gradients were used, which were computed on the basis of a spherical harmonic analysis of the universal magnetic map of 1955, compiled by IZMIR AN USSR. The precision of the obtained map was evaluated (350 gamma) and the conclusion drawn that it presents a reliable picture of the geomagnetic field above the territory of the USSR.
AD-655 702 HC$3.00 MF$0.65

GRAVITATIONAL CLINOMETER.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
N. I. Kusherbaev. 1967, 10p
ACIC-TC-1218, TT-67-62340
Gravitatsionnyi Eklimetr, trans. of Razvedochnaya Geofizika (USSR) n8 p114-8 1965.

Descriptors: (*Terrain, *Maps), (*Gravity, Instrumentation), Corrections, Telescopes, Recording systems, Scale, Measurement, Optical instruments, Control systems, Azimuth.
Identifiers: Clinometer.

As is generally known, when the influence of the terrain relief upon the readings of gravimeters is taken into account, then the region surrounding the points of observation should be divided into several elementary sections. The vertical component of attraction of an elementary section can be expressed by an angle at which any element of the relief can be observed. This served as a basis for the construction of a gravitational clinometer, which in the absence of large scale topographic maps, makes it possible to determine regional corrections at a distance of up to 50 m from the point of observation. The use of this instrument makes the determination of corrections simpler than when leveling is applied for this purpose.
AD-655 707 HC$3.00 MF$0.65

8C. Dynamic Oceanography

RUN-UP BY IMPULSIVELY GENERATED WATER WAVES.
Technical rept.,
Naval Civil Engineering Lab., Port Hueneme, Calif.
J. M. Jordaan, Jr. Dec 64, 70p NCEL-TR-330
DASA-14.083

Descriptors: (*Ocean waves, Underwater explosions), (*Water waves, Propagation), Nuclear explosions, Wave transmission, Surface burst, Theory, Experimental data, Tables, Airburst, Mathematical analysis, Cratering, Bubbles.

Theoretical and experimental studies were conducted to determine the run-up on a plane beach produced by systems of impulsive generation. The facility used for the studies consists of a wave basin which simulates the run-up of actual ocean waves on beaches. Wave trains were generated by bobbing the plunger up and down pneumatically in a single stroke or in arbitrary sequences chosen to produce wave trains simulating these produced by underwater or surface explosions. The paraboloidal shape of the plunger was chosen because it resembles the crater produced by an underwater explosion. The wave trains were recorded at several distances from the center of plunger, and the corresponding run-up on test beach units of 1:15 slope was recorded. Theoretical results were derived and compared with the observed results. The extent of agreement between theory and experiment is discussed, and preliminary conclusions are that an adequate theory exists to predict wave generation due to underwater high-explosive blasts. (Author)
AD-454 728 HC$3.00

NON-LINEAR WAVE EFFECTS ON TIDE GAGES.
Technical rept.,
California Univ Berkeley Hydraulic Engineering Lab
Ralph H. Cross. May 67, 32p Rept no. HEL-16-2
Contract DACW72-67-C-0002

Descriptors: (*Tides, *Meters), (*Water waves, Meters), Wind, Mechanical waves, Theory, Accuracy, Exposure, Orifices, Equilibrium, Computer programs, Instrumentation, Reynolds number, Equations, Measurement.

For tide stations at locations subject to moderate or high waves, the damping device is not linear, since the flow through the orifice is approximately proportional to the square root of the differential head. The purpose of this paper is to investigate the non-linear interaction between this filter and second-order wave theory, specifically estimating the effect of this interaction on the water level inside the stilling well for a variety of water depths, wave heights, wave periods, and orifice depths. (Author)
AD-655 255 HC$3.00 MF$0.65

METHODS FOR THE ANALYSIS OF NON-STATIONARY TIME SERIES WITH APPLICATIONS TO OCEANOGRAPHY.
California Univ Berkeley Hydraulic Engineering Lab
For primary bibliographic entry see Field 21A.
AD-655 256 HC$3.00 MF$0.65

A FEASIBILITY STUDY OF A WAVE-POWERED DEVICE FOR MOVING SAND,
Army Coastal Engineering Research Center Washington D C
Frederick F. Monroe. Jun 67, 47p Rept no. Miscellaneous Paper-3-67

Descriptors: (*Ocean waves, *Power equipment), (*Water tunnels, Test facilities), Beaches, Seacoast, Sand, Erosion, Armed forces research, Feasibility studies, Military engineering, Protection.

A model of a wave-powered, sand-moving device, suggested by the staff of U. S. Rubber Company Research Center, was tested for feasibility as a dredging device in 1965. Tests were made at a 1:15 scale. Waves with prototype periods of 5 to 15 seconds were tested. Wave heights varied from 1.1 to 4.4 prototype feet in prototype offshore depths of 38.7, 34.5, and 30 feet. Results indicate the device, at least in its present form, is unsuitable for moving sand shoreward from offshore sources, and further testing in the prototype is not justified. Despite disappointing results, operation of the device illustrates the possibility of a great potential for utilization of wave power.
AD-655 259 HC$3.00 MF$0.65

BEHAVIOR OF BEACH FILL AND BORROW AREA AT SHERWOOD ISLAND STATE PARK WESTPORT, CONNECTICUT.
Army Coastal Engineering Research Center Washington D C
For primary bibliographic entry see Field 15E.
AD-655 260 HC$3.00 MF$0.65

EVALUATION OF SELF-RECORDING CURRENT METER ARRAYS OCTOBER 1962-MARCH 1965.
Informal rept.,
Naval Oceanographic Office Washington D C
F. M. Daugherty, Jr. Jun 66, 61p Rept no. NOO-IR-66-7

Descriptors: (*Flowmeters, Ocean currents), Oceanographic equipment, Design, Performance (Engineering), Configuration, Mooring, Recording systems.

The Oceanographic Development Division of the U. S. Naval Oceanographic Office entered the field of current measurement in October 1962 using self-recording moored arrays. By February 1965 a total of 65 arrays had been planted with 71 percent recoveries. Out of a possible 26,774 hours of data, only 37 percent were satisfactory. Two-thirds of the data loss was due to array loss and 1/3 was due to current meter failure. The most frequently occuring data losses were due to film exposure, no compass or vane readings, and rotor failure. Only 18 percent of all current meter immersions produced completely satisfactory data. The evolution of current meter arrays during this period produced 5-basic array families which are varied to suit environment and operation situations. (Author)
AD-655 431 HC$3.00 MF$0.65

TIDAL NUMBERS AND PHASES AS DEDUCED FROM SATELLITE ORBITS.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Robert R. Newton. Apr 67, 87p Rept no. TG-905
Contract NOw-62-0604

Descriptors: (*Earth (Planet), Rotation), (*Tides, *Oceans), Upper atmosphere, Wind, Velocity, Torque, Moon, Sun, Motion, Perturbation theory, Accuracy, Orbital trajectories.

The paper uses perturbations in the inclination and in the longitude of the node for four nearly polar satellites to find values of the tidal number k and of the phases for the lunar and solar semi-diurnal tides. In order to obtain the desired accuracy, it was necessary to include the following perturbations in the analysis: (1) differences between UT2c and UT1, (2) the motions of the true coordinate systems of date, including the rotation of the ecliptic, (3) atmospheric drag, (4) radiation pressure, including radiation scattered or emitted by the satellite and including radiation scattered by the earth as well as direct sunlight, (5) the atmospheric tide, (6) the gravitational perturbations produced by the sun and moon, and (7) the perturbations due to the zonal gravity harmonics. For many of these existing perturbation procedures are not accurate enough, and new methods were devised. The new methods are described. By-products of the perturbation analysis include a small decrease in estimates of upper atmosphere wind velocities and a substantial increase in the estimated torque due to the atmospheric tide. The value found for the ratio of lunar to solar tidal friction torques is considerably greater than that given by any existing model, but is closer to the value generally given for linear friction than to that for non-linear friction. This does not imply that the friction is linear. It is shown that the relation between the torque ratio and the type of friction depends upon an unknown parameter of the oceans. Over a large range of this parameter, which includes plausible values, the ratio of the friction torques is independent of the law of friction. (Author)
AD-655 458 HC$3.00 MF$0.65

THE DIRECTIONAL SWELL SPECTRUM OFF BLOCK ISLAND,
Stevens Inst of Tech Hoboken N J Davidson Lab
Paul H. Rank, Chester E. Grosch, Stephen J. Lukasik, and George W. Zepko. Jun 67, 65p Rept no. 1155
Contract Nonr-263 (36)

Descriptors: (*Ocean waves, Measurement), (*Pressure gages, *Water waves), Interactions, Oceanology, Rhode Island, Boundary layer, Ocean bottom, Laminar flow, Navier-Stokes equations, Mathematical models.

An array of four pressure gauges was used to measure the swell off Block Island, Rhode Island. The data were analyzed to obtain the directional wave spectrum. Resulting directional information agreed with visual observations at the time of the experiment.
AD-655 465 HC$3.00 MF$0.65

DYNAMIC CHARACTERISTICS OF WEST FLORIDA GULF COAST BEACHES,
University of Southern California Los Angeles Dept of Geology
D. S. Gorsline. 16 Feb 66, 20p
Contracts Nonr-988 (07), Nonr-228 (26)
Availability: Published in Marine Geology v4 p187-206 1966.

Descriptors: (*Beaches, Dynamics), (*Ocean waves, Beaches), (*Florida, Beaches), Sedimentation, Measurement, Sand, Meteorological parameters, Wind.

During 1962 fifteen beach stations were established along the Florida coast and monitored at monthly intervals. Observations of beach profiles, sediments, wave conditions, water characteristics and wind speed and direction were recorded. Techniques closely followed those of a nearly contemporaneous study on California beaches (INGLE, 1966). This made possible a comparison of beach conditions in a low- and medium-energy environment (Florida) with a high-energy environment (California). Average wave conditions in Florida range from low ripples in the low-energy eastern segment near Keaton Beach, to over 30 cm wave height along the broad arc from Cape San Blas to the Alabama-Mississippi peri-delta region. Maximum wave heights reach 100 cm and more along the Pensacola shore and approach the average condition for high-energy beaches. Longshore current velocities, however, are surprisingly constant and range from 30 to 150 cm/sec in the general area. Statistical studies of the sediment textural parameters confirm the observations of Schiffman (1965) regarding the greater variation in texture occurring in the swash zone than in other parts of the beach system. Net sand transport is to the west and apparently is actively prograding the large spits of the area from Mobile Bay to Pensacola. Wave energy decreases west of Mississippi Sound and transport diminishes.
AD-655 562 Not available from CFSTI.

DEVELOPMENT OF AN OCEAN DATA STATION TELEMETERING BUOY.
Progress rept.
General Dynamics/Convair San Diego Calif
Dec 66, 119p Rept no. GDC-66-093
Contract Nonr-3062 (00)
See also AD-619 662.

Descriptors: (*Oceanographic equipment, *Telemeter systems), (*Buoys, Oceanographic equipment), Oceanographic data, Weather stations, Data transmission systems, Mobile, Marine meteorology, Performance (Engineering), Sensors, Electric power production.

The report describes recent activities and results in a program to develop a general-purpose ocean data station buoy and associated shore-based mobile data facilities to be used to acquire oceanographic and meteorological data in scientific experiments at sea. The telemetry and command single-sideband radio equipment being installed in the buoys is capable of operating over distances of at least 2,500 miles (4,022 km) using ordinary ionospheric short-wave propagation, but makes use of the most recent techniques in information encoding to use radio spectrum bandwidth most efficiently and effectively. The experimental operation of prototype BRAVO is covered. The report describes the Mobile Data Center being prepared for use with the prototypes, permitting long range interrogation of the buoy and reception of environmental data acquired by the buoy. Subsystem tests and results are reported, including developmental testing of the anti-collision light and the electric power system. In the case of the electric power system, important new information concerning

the extended duration performance characteristics of nickel-cadmium storage batteries is presented. Reliability and performance of a considerable number of commercially available meteorological sensors tested at sea on prototype BRAVO is also reported. (Author)
AD-655 618 HC$3.00 MF$0.65

DEEP WATER INTERNAL WAVES STUDY.
Lockheed-California Co Burbank
For primary bibliographic entry see Field 8J.
AD-655 630 HC$3.00 MF$0.65

HANDBOOK OF OCEANOGRAPHIC TABLES.
Special publication,
Naval Oceanographic Office Washington D C
Eugene L. Bialek. 1966, 434p Rept no. NOO-SP-68
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402 $6.25.

Descriptors: (*Oceanology, *Tables), (*Geography, Handbooks), Oceans, Geography, Earth (Planet), Surfaces, Ocean waves, Classification, Sea water, Aquatic animals, Marine biology.

The tables are divided into four sections: General Mensuration Information Related to the Oceans, Data on Oceans not Related to Geography, Data on Oceans Related to Geography, Tables for Computation and Conversions.
AD-655 638 MF$0.65

QUASI-SYNOPTIC MONTHLY HYDROGRAPHY OF THE TRANSITION REGION BETWEEN COASTAL AND SLOPE WATER SOUTH OR CAPE COD, MASSACHUSETTS.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 8J.
AD-655 639 HC$3.00 MF$0.65

RESPONSE CHARACTERISTICS OF A SAVONIUS ROTOR CURRENT METER.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 9C.
AD-655 641 HC$3.00 MF$0.65

COMPILATION OF REPRINTS.
Oregon State Univ Corvallis Dept of Oceanography
For primary bibliographic entry see Field 17G.
AD-655 744 Not available from CFSTI.

8D. Geochemistry

SPECTRAL STUDIES OF MATERIALS POSSIBLY PRESENT ON THE MARTIAN SURFACE.
Texas Technological Coll Lubbock Dept of Chemistry
For primary bibliographic entry see Field 3B.
AD-655 257 HC$3.00 MF$0.65

8E. Geodesy

GENERAL NON-ITERATIVE SOLUTION OF THE INVERSE AND DIRECT GEODETIC PROBLEMS.
Research note,
Army Engineer Geodesy Intelligence and Mapping Research and Development Agency, Fort Belvoir, Va.
Emanuel M. Sodano. Apr 63, 31p RN-11

Descriptors: (*Geodesics, Azimuth), Power series, Spheres, Mathematical analysis, Accuracy.

Improved practical and theoretical formulas are presented for the calculation of geodetic distances, azimuths, and positions on a spheroid. The formulas are designed for use with either electronic computers or desk calculators. For the latter, the formulas lend themselves to the construction of useful interpolation tables. The report includes convenient computation forms and auxiliary equations which assure a high degree of accuracy for any geodetic line, no matter how short or long (up to half or fully around the earth) and regardless of its orientation or location. Numerical examples illustrate the complete calculation procedure. (Author)
AD-447 282 HC$3.00

INVERSE CONVOLUTION FILTERS: AN ITERATIVE TECHNIQUE,
Texas Univ Austin Dept of Electrical Engineering
For primary bibliographic entry see Field 14C.
AD-655 405 Not available from CFSTI.

AN EXPERIMENT WITH THE CONSTRUCTION OF A GEOMAGNETIC MAP FROM DATA OF AN ARTIFICIAL EARTH SATELLITE.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8B.
AD-655 702 HC$3.00 MF$0.65

8F. Geography

CHLORINITY OF INTERSTITIAL WATER IN THE NORTH INDIAN OCEAN,
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 8H.
AD-655 236 HC$3.00 MF$0.65

SUMMARY OF THE GENERAL HYDROLOGY OF THE MEKONG DELTA.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 8H.
AD-655 247 HC$3.00 MF$0.65

HANDBOOK OF OCEANOGRAPHIC TABLES.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 8C.
AD-655 638 MF$0.65

WEATHER IN THE LUQUILLO MOUNTAINS OF PUERTO RICO.
Institute of Tropical Forestry, Rio Piedras, Puerto Rico.
For primary bibliographic entry see Field 4B.
PB-175 564 HC$3.00 MF$0.65

8G. Geology and Mineralogy

THE NORMALLY-INCIDENT REFLECTIVITY OF THE SEA FLOOR AT 12 kc AND ITS CORRELATION WITH PHYSICAL AND GEOLOGICAL PROPERTIES OF NATURALLY-OCCURRING SEDIMENTS.
Technical rept.,
Woods Hole Oceanographic Institution Mass
Lloyd R. Breslau. Apr 67, 146p Rept no. WHOI-Ref-67-16
Contracts Nonr-4029 (00), Nonr-1841 (74)

Descriptors: (*Oceanographic data, *Sedimentation), (*Acoustics, Measurement), Physical properties, Underwater photography, Particle size, Sand, Silt, Clay, Bathythermograph data, Porosity, Gravel, Tables, Shallow water, Ocean bottom, Deep water, Reflectivity, Sampling, Atlantic Ocean.

The objective of this investigation was to measure bottom loss in normal incident reflection of pulses of 12 kcps sound and to study its geological significance. A semi-automatic instrument system was developed capable of making continuous measurements of the peak pressure and the time integral of the square of the pressure of the sea-floor echo from a vessel underway. Observations were taken in both deep and shallow water in the Western North Atlantic. The early cruises were conducted in deep water to investigate the range and variability of bottom loss. Geological control consisted mainly of a precise bathymetric record. Later cruises were conducted in shallow water where the geology had been well studied previously. In these latter cruises the acoustic measurements were correlated with sediment dredging and underwater photography. Thirty-one thousand acoustic measurements were made. Median bottom loss values and standard deviations were computed and the results summarized in eleven hundred sets, each set corresponding with a location at sea. Seventy-seven sediment stations were occupied. A complete particle size analysis and a water content analysis were performed on these sediments to determine their size and mass characteristics. (Author)
AD-655 245 HC$3.00 MF$0.65

STRATIGRAPHIC ANALYSIS OF A DEEP ICE CORE FROM GREENLAND.
Research rept.,
Cold Regions Research and Engineering Lab Hanover N H
C. C. Langway, Jr. May 67, 136p Rept no. CRREL-RR-77

Descriptors: (*Stratigraphy, Ice), (*Ice, *Greenland), Climatology, Snow, Physical properties, Density, Oxygen, Isotopes, Drilling, Impurities, Glaciers, Periodic variations, Geologic age determination, Metals, Particle size, Microscopy, Tables.

A deep rotary core drilling project in 1957 at Site 2 on the Greenland ice sheet (76 deg 59 min N, 56 deg 04 min W) provided ice core to a depth of 411 m. The vertical variation in bulk density, macroscopic structure, oxygen isotope ratios, ionic constituents, and extraterrestrial dust (black spherules) were analyzed using both field and laboratory technqies. These data permit the direct estimate of annual accumulation layers in the core. Continuous stratigraphic measurements and observations were made over the upper 110 m of the profile and detailed physical and chemical analyses were made on continuous 1.3 to 3.9-m core increments at 100, 200, 300 and 411-m depths. The average total ionic concentration in the ice sheet ranges between 0.65 and 1.35 mg/liter. The annual global mass deposit of black spherules as calculated from these studies varies from 2.10 x 10,000 metric tons in 700 year old ice to 6.57 x 10,000 metric tons in 12 year old firn. The oxygen isotope ratio variation provides the best means of estimating accumulation at depth. Results of the investigations indicate rates of net snow accumulation of 42.3, 34.2, 37.4, 41.1 and 41.6 g/sq cm -yr at the surface, A.D. c. 1773, c. 1513, c. 1233 and c. 934, respectively. Accumulation data and other physical and chemical evidence allow climatological inferences to be made over the 10-century profile. The ice core record shows that snow accumulation and temperature in A.D. 934 were similar to today, followed by a gradual decrease in accumulation to a minimum around the late 18th century and an increase in both accumulation and temperature from A.D. 1773 to 1957 and following. (Author)
AD-655 264 HC$3.00 MF$0.65

FORTRAN IV COMPUTER PROGRAMS FOR MARKOV CHAIN EXPERIMENTS IN GEOLOGY.
Technical rept.,
Northwestern Univ Evanston Ill Dept of Geology
W. C. Krumbein. Jul 67, 44p Rept no. TR-6
Contract Nonr-1228 (36)
Prepared in cooperation with Kansas Univ., Lawrence, Computer Contrib-13.

Descriptors: (*Geology, *Computer programs), (*Programming languages, *Stochastic processes), Probability, Simulation, Stratigraphy, Numerical methods and procedures, Rock (Geology), Topology, Statistical tests.

Probabilistic models provide a mechanism for computer simulation of a wide variety of geological processes. This paper emphasizes first-order Markov chains because of their intuitive appeal and rapidly growing applications. Examples are based on stratigraphic analysis, but other uses of the model are discussed briefly. First-order Markov chains are among the simplest stochastic process models, and they afford a point of entry into a large class of probabilistic mechanisms that can be useful in geology. This paper is designed to stimulate experimentation with these models, in part by providing relatively simple computer programs that cover four aspects of such analysis. These programs, listed in the Appendix, include one for testing the presence of a Markov property, a second for raising the transition probability matrix to successive powers in order to estimate the equilibrium states (i.e., the fixed probability vector) of a system, and a third for using the transition matrix in simulation studies. A fourth program for simulating independent-events processes (non-Markovian) can be used with the fixed probability vector of a Markov chain to obtain some interesting comparisons among different ways of structuring a sequence of observations or events. (Author)
AD-655 447 HC$3.00 MF$0.65

SEDIMENTOLOGIC STUDIES OF THE COLORADO DELTA.
Final rept. 1 Jul 64-30 Jun 66,
University of Southern California Los Angeles Dept of Geology
D. S. Gorsline. Mar 67, 121p Rept no. USC-GEOL-67-1
Contract Nonr-228 (29)

Descriptors: (*Deltas, Colorado), (*Rock (Geology), Terrain), Clay minerals, Climatology, Salinity, Swamps, Faults (Geology), Sedimentation, Mud, Aerial photographs.

The report reviews the work accomplished under the original contract including literature review, sedimentologic data analysis, and surficial characteristics of the Colorado Delta with emphasis on the lower portions of the delta. The Colorado is distinctive since it is a major delta built under highly arid climatic conditions. This special climatic setting produces a very different assemblage of surficial types with barren mud flats predominating, and salinas second in importance but with marshes a negligible type in contrast to most other major deltas such as that of the Mississippi River where marshes are the dominant surficial form. The lack of peat deposits may also contribute to the much less evident compaction subsidence of the delta and the relatively stable form of the feature since its first exploration some four centuries ago. A second unusual condition is that the delta is situated in the graben formed by one of the major active fault systems of the world. Thus faulting and active movement of a tectonic nature are the major influences on the form of the delta. Traces of scarps can be seen on aerial photographs of the deltaic plain. Several problems are evident for future research including a study of the clay mineralogy of this delta, particularly in areas of exceptionally high salinity; tectonic effects on sedimentation; and rates of accretion.
AD-655 631 HC$3.00 MF$0.65

ON RELATION OF MAGNETIC ANOMALIES TO THE STRUCTURE OF THE EARTH CRUST IN THE SOUTHEASTERN PART OF CENTRAL KAZAKHSTAN.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 17F.
AD-655 698 HC$3.00 MF$0.65

INTERPRETATION OF GRAVITY AND MAGNETIC ANOMALIES PERTAINING TO VERTICAL CONTACTS OF BLOCKS OF ROCK.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 17F.
AD-655 699 HC$3.00 MF$0.65

GEOLOGICAL DATA ON THE AEROMAGNETIC SURVEY OF THE SOUTHEASTERN PART OF THE RUSSIAN PLATFORM AND ITS FOLDED FRAMING.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
D. P. Kasatkin. 1967, 17p
ACIC-TC-1237, TT-67-62342
Geologicheskie Resultaty Aeromagnitnoi Semki Yugo-Vostochnoi Chasti Russkoi Platformy i Ee Skladchatogo Obramleniya, trans. of Sovetskaya Geologiya (USSR) n10 p69-78 1966.

Descriptors: (*Geology, USSR), (*Terrain, *Structural geology), Magnetic fields, Geologic age determination, Magnetic anomaly detection, Intensity, Anomalies, Maps, Rock (Geology), Volcanoes.

The southeastern part of the Ukrainian uplift and the Caspian region basin together with the adjacent parts of the Volga-Ural uplifts, the Voronezh uplift and the system of depressions of the Cisural basin are the main structural-tectonic elements of the southeastern part of the Russian platform. The folded framing is composed of the Ciscaucasus--Kopet-Dag Epihercynian platform of the western part of Tien Shan, the Southern Ural and the southern part of the Turgay depression. The magnetic field, characteristic of this territory, is probably connected with sources situated in the crystalline base (Kasatkin, 1965). We assume that within the limits of the Russian platform and the northern Ciscaucasus-Great Donbas the base belongs to the Precambrian age. In the northern part of the territory of Southern Ciscaucasus-Stavropol region and the Ciscaucasian foredeep the base also belongs to the same age, while in the remaining part it belongs to the Paleozoic age, apparently to the Pre-Upper Devonian period. In the Transcaspian region, which includes parts of the Southern Ural and Tien Shan, the base belongs to the Pre-Upper Devonian period, while on the Southern Ural (partially) and in the Western Tien Shan it belongs to the Post-Middle Devonian (Hercynian) period. The sources of the magnetic anomalies are mainly bedded in the roof of the crystalline base, however some are situated within it, mostly in the depressions of the roof.
AD-655 700 HC$3.00 MF$0.65

ON THE SEPARATION OF REGIONAL MAGNETIC ANOMALIES.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 17F.
AD-655 701 HC$3.00 MF$0.65

SIGNIFICANCE OF EPEIROGENETIC CURVES FOR THE INTERPRETATION OF SPACIAL DISTRIBUTION OF THE GEOMAGNETIC FIELD.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
V. V. Kruglyakov, and G. I. Kruglyakova. 1967, 17p
ACIC-TC-1194, TT-67-62396
Znachenie Epeyrogenicheskikh Krivykh dlya Interpretatsii Prostranstvennogo Raspredeleniya Geomagnitnogo Polya, trans. of Sovetskaya Geologiya (USSR) n11 p68-77 1966.

Descriptors: (*Terrestrial magnetism, *Maps), (*Magnetometers, Geology), Numerical analysis, Computers, Anomalies, Intensity, Detection, Accuracy, Magnetism, Anomalies.

Until now the maps of isolines for the magnetic field on the observation area were compiled according to data of the terrestrial and aeromagnetic surveys. These maps were used in the geological interpretation. The method of spacial distribution of the geomagnetic field was sometimes used in the quantitative interpretation of separate anomalies. A wider application of the spacial analysis was hampered by the bulk of computations. Introduction of electronic computers made it possible to more fully utilize the magnetometric data and to pass over from the observation analysis on the plane to the analysis of spacial distribution of the genomagnetic field.
AD-655 703 HC$3.00 MF$0.65

DETERMINATION OF SOME PARAMETERS OF OBLIQUE-MAGNETIZED BODIES OF ARBITRARY SHAPE.
Technical translations,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
G. I. Menaker. 1967, 7p
ACIC-TC-1195, TT-67-62397
Opredelenie Nekotorych Parametrov Koso-Namagnichennykh Dvukhmernykh tel Proizvolnoi Formy, trans. of Geologiya i Geofizika (USSR) n8 p103-5 1966.

Descriptors: (*Gravity, Integrals), (*Approximation (Mathematics), Accuracy), Magnetism, Asymptotic series, Geometric forms, Polynomials, Functions, Interpolation, Cylindrical bodies.

The construction of a scheme for the numerical realization of the obtained formulas represents well known difficulties, since continuously potentical functions Z (x) and H (x) given on the final section of profile (-Rn, + Rn) and an exact determination of asymptotes A sub o and B sub o and integrals Q1 and Q2 are impossible. However, by approximate methods it is possible (with sufficiently high accuracy) to determine these values also for relatively short profiles.
AD-655 704 HC$3.00 MF$0.65

DETERMINATION OF MAGNETIZATION (DENSITY) OF ROCKS COMPOSING RELIEF, ACCORDING TO MAGNETIC (GRAVITATIONAL) SURVEY.
Technical translations,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
G. G. Rempel. 1967, 11p
ACIC-TC-1196, TT-67-62398
Opredelenie Namagnichennosti (Plotnosti) Porod, Slagayushchikh Relef, po Dannym Magnitnoi (Gravitatsionnoi) Semki, trans. of Geologiya i Geofizika (USSR) n8 p105-8 1966.

Descriptors: (*Rock (Geology), *Magnetism), Density, Gravity, Terrestrial magnetism, Magnetic fields, Corrections, Accuracy, Terrain, Anomalies, Geophysical prospecting.

The introduction of corrections for the intermediate layer in gravimetry and for the relief in gravimetry and magnetometry requires knowledge of the mean or effective density (magnetization) of the rocks composing the intermediate layer and relief. The measurements of magnetization and density according to samples has not been done for all the regions, and frequently it does not yield the average values required by the computation. Because of this circumstance it is necessary to use the gravimetric and magnetometric data.
AD-655 705 HC$3.00 MF$0.65

ORIGIN OF THE CRIMEA AND BLACK SEA.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section

S. A. Kovalevskii. 1967, 11p
ACIC-TC-1215, TT-67-62399
Proiskhozhdenie Kryma i Chernogo Morya, trans. of Priroda (USSR) n3 p108-13 1966.

Descriptors: (• Black Sea, • Geology), (• Ocean bottom, • Mountains), Rock (Geology), Geophysics, Structural geology, Limestone, Reefs, Anomalies, Sedimentary rock, Minerals, Ocean bottom topography, Volcanoes.

It is generally assumed that the Crimean mountains represent the remnants of a large mountain structure-anticlinorium, similar to the Caucasus Mountains, destroyed during the formation of the Black Sea basin. Many geologists considered the Black Sea to be an area where the larger part of the Crimean anticlinorium was buried. Therefore they tried to find in the relief of the sea bottom traces of sunken mountains. However, such research provided no positive data, while recent geological works with the use of more and more perfect methods of rock analysis, detailed survey and abyssal boring, together with high level geophysical investigations discovered many structural details of Crimea and the Black Sea bottom, which cast a new light upon objects and facts which were considered to be already well known.
AD-655 706 HC$3.00 MF$0.65

SAN ANDREAS FAULT NORTH OF POINT ARENA, CALIFORNIA,
Scripps Institution of Oceanography La Jolla Calif
Joseph R. Curray, and Robert D. Nason. Jun 67, 10p
Contract Nonr-2216 (23)
Availability: Published in Geological Society of America Bulletin v78 p413-8 Mar 1967.

Descriptors: (• Faults (Geology), • California), Ocean bottom topography, Seacoast, Maps, Structural geology.
Identifiers: San Andreas Fault.

Continuous reflection profiling north of Point Arena, California, shows that the San Andreas fault bends toward Shelter Cove rather than continuing in a straight line from the southeast. North of Shelter Cove, the fault probably remains nearshore until it reaches the vicinity of Punta Gorda, and may then curve westward along the Gorda Escarpment. (Author)
AD-655 709 Not available from CFSTI.

CENOZOIC OROSPHAERID RADIOLARIANS FROM TROPICAL PACIFIC SEDIMENTS,
Scripps Institution of Oceanography La Jolla Calif
William R. Riedel, and Jennifer K. Friend. 1967, 20p
Contract Nonr-2216 (23)
Prepared in cooperation with Cambridge Univ. (England). Dept. of Geology.
Availability: Published in Micropaleontology v13 n2 p217-32 Apr 1967.

Descriptors: (• Pacific Ocean, Tropical regions), (• Marine geology, • Marine biology), Classification, Stratigraphy, Sedimentation, Geologic age determination, Aquatic animals, Oceanology.

A new system of generic classification is proposed for the Orosphaeridae, a radiolarian family apparently restricted to the Cenozoic. Orodapis, Oropagis, Oropelex, and Orostaurus are described as new genera, and Orodendrum Haeckel and Oroscena Haeckel are redefined. Most of thetaxa considered here (six genera and seven species) have stratigraphic ranges of only one or two epochs, and it is concluded that the family is potentially useful stratigraphically, especially in sparsely fossiliferous pelagic sediment sequences.
AD-655 714 Not available from CFSTI

LATE TERTIARY BIOSTRATIGRAPHY (PLANKTONIC FORAMINIFERA) OF TROPICAL INDO-PACIFIC DEEP-SEA CORES,
Scripps Institution of Oceanography La Jolla Calif
Frances L. Parker. 30 Jun 67, 114p
Contract Nonr-2216 (23)
Availability: Published in Bulletins of American Paleontology v52 n235 p115-208 1967.

Descriptors: (• Marine geology, • Marine biology), (• Aquatic animals, Tropical regions), Indian Ocean, Pacific Ocean, Ecology, Classification, Plankton, Foraminifera.

Upper Miocene and Pliocene sections of 18 cores, 1 dredge sample and 5 samples from Fiji have been analyzed. The Banner and Blow (1965b, 1967) zonation seems best suited for this part of the section in the tropical Indo-Pacific area, with the possible exception of their Zone N.20. The zonations of Bandy (1963a, b, 1964b), Bolli and Bermudez (1965; Bolli, 1966a), and McTavish (1966) are compared and analyzed. Boundary problems are discussed. The Miocene-Pliocene boundary is placed between Banner and Blow's Zones N.18 and N.19 (slightly higher than its placement in a rigid sense), the Pliocene-Pleistocene boundary between Zones N.21 and N.22. An interesting ecological feature is the first appearance in Zone N.21 (upper Pliocene) of temperate species such as Globigerina falconensis and Globorotalia inflata, possibly G. tosaensis, which are known to range lower elsewhere. Evolutionary sequences have been defined, when possible, including species of Globoquadrina, Pulleniatina, Sphaeroidinella. Generic classification problems are discussed. The subfamily Candeininae is raised to family status. Pulleniatina is placed in the Catapsydracidae. The polyphyletic genus Turborotalia is included in Globorotalia, but Globigerinoides is retained pending additional study. Globoquadrina is emended to include related, pitted-wall species having umbilical-extraumbilical apertures and apertural teeth. Four new species are described: Globanomalina praepumilio, Globigerina praedigitata, Globoquadrina pseudofoliata, and Globorotalia anfracta.
AD-655 715 Not available from CFSTI.

STRUCTURE OF THE WESTERN SOMALI BASIN.
Technical rept.,
Woods Hole Oceanographic Institution Mass
Elizabeth T. Bunce, M. G. Langseth, R. L. Chase, and M. Ewing. 6 Oct 66, 12p Rept no. WHOI-Ref-67-38, WHOI-Contrib-1855
Contract Nonr-4029 (00), Grant NSF-GP-2370
Prepared in cooperation with Lamont Geological Observatory, Palisades, N. Y., Contrib-1037.
Availability: Published in Journal of Geophysical Research v72 n10 p2547-55 May 15 1967.

Descriptors: (• Marine geology, Geophysics), (• Indian Ocean, Deposits), Seismology, Reflection, Gravity, Magnetic properties, Structural geology, Sedimentation, Sedimentary rock, Geologic age determination.
Identifiers: Somali basin.

The western Somali Basin in the northwestern Indian Ocean is covered by thick deposits of terrigenous sediments. Seismic reflection profiles show, however, the northern and southern parts to be very different. The northern sections is a deep basin filled with thick uniformly stratified sediments. It is enclosed by the continental margin to the west and north, Chain ridge to the east, and shallow basement structure to the south. A change in depth of basement occurs along an approximately east-west line at latitude 3 deg. 30 min. N very near the southern end of Chain ridge. In the southern portion of the basin the basement is shallow, and, immediately south of latitude 3 deg. 30 min. N, it has high relief. Stratified flat-lying sediments fill the basement depressions, and isolated hills formed of basement material rise above the abyssal plain deposits. Farther to the south the abyssal plain becomes very narrow. Gabbro dredged from the southeast slope of Chain ridge has been dated by the potassium-argon method as 89.6 plus or minus 4.5 m.y., which should be considered a minimum age. The evidence suggests that the entire sediment sequence of the northern basin was deposited subsequent to the formation of the ridge. The thin sediment cover of the southern portion of the basin is probably no older than Tertiary.
AD-655 742 Not available from CFSTI.

SPHERULES IN SEDIMENTARY ROCKS.
Final rept. 1 May 66-30 Apr 67,
Brown Univ Providence R I Dept of Geological Sciences
Thomas A. Mutch. May 67, 44p
AFCRL-67-0315
Contract AF 19 (628)-6008

Descriptors: (• Sedimentary rock, Chemical analysis), (• Petrology, • Stratigraphy), Salts, Deposits, Rock (Geology), Distribution, Limestone, Sedimentation, Magnetic fields.

Rock salts and cherts have been processed for recovery of magnetic spherules. An assumption of constant spherule influx throughout geologic time is compatible with actual spherule abundances both in rapidly deposited salts of Silurian, Permian and Triassic age and slowly deposited cherts of Jurassic age. Repeated small-area chemical analyses of spherule polished surfaces with an electron microprobe reveal no obvious segregation of phases. Two groups of spherules can clearly be distinguished. The first is made up chiefly of Fe with small amounts of Mn and Cr. The second group contains variable amounts of Fe, Si, K, Al, Ca, and Ti. (Author)
AD-655 794 HC$3.00 MF$0.65

8H. Hydrology and Limnology

IRRIGATION AS A FACTOR IN THE ECONOMIC DEVELOPMENT OF THAILAND,
Special Operations Research Office, Washington, D. C. Counterinsurgency Iformation Analysis Center.
James R. Price. Jun 64, 10p SORO/CINFAC/1-64
Contract DA-49-092-ARO-7

Descriptors: (• Irrigation systems, T iland), (*Cereals, Irrigation systems), History, Economics, Floods, Counterinsurgency, Agriculture, Rural areas.

The question of irrigation and flood control in Thailand has been historically bound together not only with the immediate problems of production of Thailand's main export crop of paddy rice, but with the pattern of Thailand's foreign economic and political relations. Developmental irrigation and flood control projects only now nearing completion are virtually identical to those recommended more than half a century ago by a Dutch irrigation adviser, and which could have been completed within twelve years at a fraction of the cumulative costs, both in capitalization and crop losses, to date. (Author)
AD-464 900 HC$3.00

CHLORINITY OF INTERSTITIAL WATER IN THE NORTH INDIAN OCEAN,
Naval Oceanographic Office Washington D C
O. V. Shishkina, and A. A. Zheleznova. 1967, 18p Rept no. NOO-Trans-326
TT-67-62297
Khlornost Ilovykh vod Severnoi Chasti Indiiskogo Okeana, trans. of Akademiya Nauk SSSR. Institut Okeanologii. Trudy, v64 p144-53 1964.

Descriptors: (• Chlorine, • Indian Ocean), (• Hydrology, Indian Ocean), Salinity, Ocean bottom sampling, Sea water, Diffusion, Sedimentation, Tables, Red Sea, USSR.

Distribution of chlorinity of the interstitial water was studied in cores of sediments of the Red and Arabian Seas, Indian Ocean and Bay of Bengal. There is a correspondence between the chlorinity of the interstitial water and the hydrological regime. (Author)
AD-655 236 HC$3.00 MF$0.65

MANUAL OF SIMPLE FIELD TECHNIQUES FOR MEASURING WATER LEVEL FLUCTUATIONS AND SURFACE CURRENT PATTERNS.
Informal rept.,
Naval Oceanographic Office Washington D C
Willis S. Glidden, and Donald A. Burns. Jun 67, 33p Rept no. NOO-IR-67-50

Descriptors: (*Hydrology, Measurement), Design, Surface properties, Rivers, Water, Inland waterways, Meters, Velocity, Sampling, Tables.

The manual is designed to provide the non-professional hydrographer with the necessary techniques for taking water level and current measurements in rivers and canals. Those techniques which negate the need for sophisticated field equipment are stressed. Examples of data recording forms and instructions are provided to aid in collecting field observations. (Author)
AD-655 246 HC$3.00 MF$0.65

SUMMARY OF THE GENERAL HYDROLOGY OF THE MEKONG DELTA.
Informal rept.,
Naval Oceanographic Office Washington D C
Donald A. Burns. Jun 67, 43p Rept no. NOO-IR-67-46

Descriptors: (*Hydrology, Vietnam), (*Deltas, *Inland waterways), Drainage, Climatology, Swamps, Tides, Floods, River currents, Atmospheric precipitation, Armed forces operations.
Identifiers: Mekong Delta.

The Mekong Delta is composed of major streams, their distributaries, and numerous short tidal streams. Smaller streams, canals and ditches, and large areas of marsh and swamp modify the major stream pattern. Large tidal fluctuation as well as seasonal inundation further complicate the problem of obtaining reliable and timely environmental data. To the extent that it is possible, this report briefly summarizes the climate, tides, currents, and vertical control of the Mekong Delta.
AD-655 247 HC$3.00 MF$0.65

CONTRASTS IN COASTAL BAY SEDIMENTS ON THE GULF AND PACIFIC COASTS,
University of Southern California Los Angeles Dept of Geology
For primary bibliographic entry see Field 8J.
AD-655 561 Not available from CFSTI.

STRUCTURE OF THE WESTERN SOMALI BASIN.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 8G.
AD-655 742 Not available from CFSTI.

COMPILATION OF REPRINTS.
Oregon State Univ Corvallis Dept of Oceanography
For primary bibliographic entry see Field 17G.
AD-655 744 Not available from CFSTI.

8J. Physical Oceanography

THE NORMALLY-INCIDENT REFLECTIVITY OF THE SEA FLOOR AT 12 kc AND ITS CORRELATION WITH PHYSICAL AND GEOLOGICAL PROPERTIES OF NATURALLY-OCCURRING SEDIMENTS.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 8G.
AD-655 245 HC$3.00 MF$0.65

TRACK CHARTS, BATHYMETRY, AND LOCATION OF OBSERVATIONS, ATLANTIS CRUISE NO. 223, MARCH 7 - JUNE 3, 1956, BEAR CRUISE NO. 140, FEBRUARY 27 - JUNE 3, 1956, NORTH ATLANTIC OCEAN AND CARIBBEAN SEA.
Technical rept.,
Woods Hole Oceanographic Institution Mass
K. G. Bumpus, and W. M. Dunkle. Mar 67, 238p Rept no. WHOI-Ref-67-14
Contract Nonr-4029 (00)

Descriptors: (*Hydrographic surveying, Atlantic Ocean), (*Oceanology, Atlantic Ocean), Maps, Oceanographic data, Ocean bottom topography.

The report contains charts of Cruise 223 of the ATLANTIS and charts of Cruise 140 of the BEAR in the North Atlantic Ocean and Caribbean Sea. There are 112 charts plotted on a Mercator Projection (scale 1 degree longitude equals 4 inches) showing the track of both ships. All types of observations made during the cruises are noted by suitable symbols or legends along the ship track. Soundings are read at equal time intervals, usually every ten minutes, and at each break in slope. They are written along the ship's track as often as space permits. All soundings are based on a sound velocity of 800 fathoms/sec. and are corrected only for depth-of-transducer. (Author)
AD-655 427 HC$3.00 MF$0.65

AUTOMATION OF UNDERSEA FEATURE NAMES.
Informal rept.,
Naval Oceanographic Office Washington D C
M. Karl Jugel. Jun 67, 25p Rept no. NOO-IR-67-13
Prepared for presentation at Convention of American Congress on Surveying and Mapping, 1967 American Society of Photogrammetry, Washington, D. C. Technical paper-6-276.

Descriptors: (*Information retrieval, *Data storage systems), Magnetic tape, Ocean bottom, Accuracy, Automation, Bathythermograph data, Underwater, Oceanology, Hydrology.

During 1964 the Bathymetry Division of the Hydrographic Surveys Department, U. S. Naval Oceanographic Office, established three Hollerith card files for undersea feature information. One file, converted to magnetic tape in July 1966, contains alphabetical undersea names, another the locations and other pertinent information on named and unnamed 'minor' features (seamounts, etc.) and the third, information on 'major' features. The files contain the actions of the Advisory Committee on Undersea Features of the Board on Geographic Names, and are used to implement their actions in the U. S. Naval Oceanographic Office's Bottom Contour Chart Program and in various special studies. A comprehensive automated system using modifications of these three files to facilitate the preparation of Bottom Contour and other charts and studies is given. The system can be used to give a contourer advanced information on critical features of interest in the area being analyzed and hopefully improve the accuracy and quality of contours.
AD-655 449 HC$3.00 MF$0.65

THE DIRECTIONAL SWELL SPECTRUM OFF BLOCK ISLAND,
Stevens Inst of Tech Hoboken N J Davidson Lab
For primary bibliographic entry see Field 8C.
AD-655 465 HC$3.00 MF$0.65

CONTRASTS IN COASTAL BAY SEDIMENTS ON THE GULF AND PACIFIC COASTS,
University of Southern California Los Angeles Dept of Geology
D. S. Gorsline. 1967, 7p
Contract Nonr-988 (07)
Availability: Published in Estuaries p219-25 1967.

Descriptors: (*Sedimentation, Bays), Mexico Gulf, Pacific Ocean, Ocean bottom topography, Beaches, Estuaries.

Estuaries, bays, and lagoons are probably all the products of processes active over recent time and probably for no more than the past 3,000 years. Sedimentary patterns in these bodies of water reflect the combined effect of bottom topography and circulation, and sands are the major size grade present. Estuaries are primarily products of coastal submergence, although secondary processes and climate may create somewhat different local forms of estuaries. On bluff, high-energy coasts with narrow shelves, estuaries are separated from the open sea by spits or beach deposits, and barrier islands and their associated lagoons are rare or absent. On low- and medium-energy coasts with broad shelves, estuaries commonly are fronted by barrier islands and coastal lagoons; often at least two sequences of these are present. Circulation in estuaries is predominantly by tidal currents. The positions of inlets in the barriers or spits are probably determined and maintained by the tidal pattern in each bay, and these in turn determine the location of areas of deposition and erosion in the bays. Much of the sediment in estuaries is derived from seaward or coastal sources. When streamborne sedimentation is dominant, the estuary soon yields to the delta. Estuarine and bay sediments tend to be relatively thin because of the geometry of the form and the fact that they are simply drowned segments of the coast. The aspect of an estuary changes with time as sedimentation progresses, or as climate and source and volume of sediment supply change.
AD-655 561 Not available from CFSTI.

A CONTINUOUS GRADIENT RAY TRACING TECHNIQUE.
Navy Underwater Sound Lab New London Conn
For primary bibliographic entry see Field 17A.
AD-655 617 HC$3.00 MF$0.65

A PREDICTIVE HORIZONTAL-TEMPERATURE-GRADIENT MODEL OF THE UPPER 750 FEET OF THE OCEAN.
Research rept. Jul 62-Jul 65,
Navy Electronics Lab San Diego Calif
E. L. Smith. 17 Mar 67, 92p Rept no. NEL-1445

Descriptors: (*Pacific Ocean, Temperature), (*Temperature, Ocean models), Data, Sound transmission, Underwater sound, Measurement, Oceanographic data.

Time-dependent horizontal-temperature gradients were computed from vertical-temperature cross sections taken with the towed thermistor chain in 17 areas of the eastern North Pacific. The horizontal gradients were found to be generally smaller than the vertical gradients by two orders of magnitude. The horizontal-gradient field alternated regularly in sign, implying a dominant frequency of internal waves or convection cells (with a corresponding wavelength of 0.72 nautical mile). The horizontal gradient in the thermocline can be predicted from the measured vertical gradient by means of the equation: $dT/dx = 0.0047\ (dT/dz)$ to the 0.71 power. On the basis of these results, plus a single bathythermograph lowering, a simplified predictive model of the horizontal-temperature gradients was constructed. (Author)
AD-655 620 HC$3.00 MF$0.65

DEEP WATER INTERNAL WAVES STUDY.
Final rept. 7 Mar 61-31 Jul 67,
Lockheed-California Co Burbank

Alfred J. Carsola. 31 Jul 67, 49p Rept no. LR-20848
Contract Nonr-3348 (00)

Descriptors: (*Tides, Bathythermograph data), Sea water, Ocean waves, Sound transmission, Temperature, Thermistors, Analysis of variance.

Two arrays of thermistors were installed and operated off San Clemente Island, California, for several months in 1964 and from 5 August 1965 to 16 January 1966. For the latter array, thermistors at 240' and 340' were inoperative after 3 September 1965, but data are available for the thermistors at 1640' and 1740' from 5 August 1965 to 16 January 1966. Spectra of temperature fluctuations show little statistical energy at frequencies above 0.04 cycles per minute, corresponding to periods below 25 minutes. Only rarely was the frequency corresponding to 0.01C/cy/min greater than .006 cpm (period of 166 minutes or about 3 hours). Some peaks occasionally appear at frequencies higher than 0.04 cpm, but these are small and probably not significant. The spectra for the longest continuous records from 18 November to 27 December 1966 show two peaks, one at approximately 12 hours, and the other between 24 and 32 hours. Results of these experiments emphasize the dominance of tidal periods in thermal fluctuations and indicate that relationships between surface and internal tides should be clearly established. These results are in substantial agreement with those obtained by other investigators in the past decade. (Author)
AD-655 630 HC$3.00 MF$0.65

HANDBOOK OF OCEANOGRAPHIC TABLES.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 8C.
AD-655 638 MF$0.65

QUASI-SYNOPTIC MONTHLY HYDROGRAPHY OF THE TRANSITION REGION BETWEEN COASTAL AND SLOPE WATER SOUTH OR CAPE COD, MASSACHUSETTS.
Technical rept.,
Woods Hole Oceanographic Institution Mass
G. M. Cresswell. Jul 67, 100p Rept no. WHOI-Ref-67-35
Contract N00014-66-C-0241

Descriptors: (*Sea water, Massachusetts), (*Gulf Stream, *Continental shelves), Environment, Hydrology, Salinity, Turbulence, Tides, Periodic variations, Cooling, Density, Stability, Energy, Mixtures, Exchange reactions, Nova Scotia.

Detailed hydrographic conditions are enlarged upon in the area south of Nantucket and Martha's Vineyard at the boundary between Coastal and Slope Water at the edge of the continental shelf off Cape Cod, Mass. Five monthly cruises were made during a spring-summer season from May to September, 1958 to study detailed temperature and salinity distribution in both water masses at their boundary. Basic midsummer volumetric relations are given between water on the shelf and that in a parcel moved offshore, an inferred rate of formation of such parcels for July, the seasonal reduction in volume of cold shelf bottom water, and the monthly variation of areas between given isohalines in the halocline. Maximal observed salinity gradient is 2.4 0/00 per 10 meters. Parcel detachment is initiated by turbulence from internal waves shoaling in the density gradient of the halocline when the residual winter cooled shelf bottom water is in a state of quasi-inequilibrium. Tidal agitation then provides energy to move the parcel offshore. Instability and many inversions are observed in the collected data. Mixing between Coastal and Slope Water occurs on the larger scale of parcels of the former moving offshore into the latter and also by small scale exchange across the transition region separating the water masses. Regional development on the shelf edge thermal structure which effects offshore movement of the parcels is seasonal and is due to given occurrences in the shelf-slope area. Development both of them and an offshore body of water of temperature structure similar to it was extreme in 1958.
AD-655 639 HC$3.00 MF$0.65

RESPONSE CHARACTERISTICS OF A SAVONIUS ROTOR CURRENT METER.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 9C.
AD-655 641 HC$3.00 MF$0.65

ORIGIN OF THE CRIMEA AND BLACK SEA.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8G.
AD-655 706 HC$3.00 MF$0.65

SAN ANDREAS FAULT NORTH OF POINT ARENA, CALIFORNIA,
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8G.
AD-655 709 Not available from CFSTI.

FURTHER OBSERVATIONS ON THE SECONDARY NITRITE MAXIMUM IN THE NORTHERN EQUATORIAL PACIFIC,
Scripps Institution of Oceanography La Jolla Calif
Warren S. Wooster. 18 Feb 67, 8p
Contract Nonr-2216 (23)
Availability: Published in Journal of Marine Research v25 n2 p154-61 1967.

Descriptors: (*Sea water, Nitrites), Pacific Ocean, Oceanographic data, Thermoclines, Oceanology.

The secondary nitrite maximum was observed in May 1965 at nine stations south of the boundary between the western extension of the California Current and the North Equatorial Current. Association of high nitrite concentrations with low dissolved-oxygen concentrations and high salinity in the Equatorial Pacific salinity maximum suggests that the northern boundary of the secondary nitrite maximum is related to the northern limit of penetration by Equatorial Pacific water. (Author)
AD-655 712 Not available from CFSTI.

CENOZOIC OROSPHAERID RADIOLARIANS FROM TROPICAL PACIFIC SEDIMENTS,
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8G.
AD-655 714 Not available from CFSTI.

STRUCTURE OF THE WESTERN SOMALI BASIN.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 8G.
AD-655 742 Not available from CFSTI.

R/V CHAIN CRUISE NO. 60. SUMMARY CRUISE REPORT TRACK CHARTS, BATHYMETRY, AND LOCATION OF OBSERVATIONS: NORTH ATLANTIC OCEAN, CARIBBEAN SEA-GULF OF MEXICO, 18 MAY-30 JUNE 1966,
Woods Hole Oceanographic Institution, Mass.
W. M. Dunkle, and G. K. Witzell. Apr 67, 94p
WHOI-Ref-67-10
Grants NSF-GP-5319, NSF-GB-4431

Descriptors: (*Oceanology, *Atlantic ocean), Bathythermographs, Depth finding, Underwater sound, Maps, Ocean bottom sampling, Aquatic animals, Plankton, Mexico Gulf, Caribbean Sea.

The report contains charts and cruise summary of CHAIN Cruise 60 in the North Atlantic Ocean, Caribbean Sea and Gulf of Mexico. There are 39 charts plotted on a Mercator Projection (scale 1 degree longitude equals 4 inches) showing the track of the entire cruise. All types of observations made during the cruise are noted by suitable symbols or legends along the ship's track. Soundings are read at equal time intervals, usually every ten minutes, and at each break in slope. They are written along the ship's track as often as space permits. All soundings are based on a sound velocity of 4800 fathoms/sec. and are corrected only for depth of transducer. (Author)
PB-175 617 HC$3.00 MF$0.65

8K. Seismology

A BIBLIOGRAPHY OF SEISMOLOGY FOR THE VELA UNIFORM PROGRAM.
2nd ed.,
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
Robert Lormand, Dorothy Fries, and George F. Kennedy. Jul 65, 846p Rept. no. 4410-81-B
Contract SD-78
Rept. on proj. VESIAC.

Descriptors: (*Seismology, Bibliographies), Abstracts, Subject indexing, Reports, Documentation, Underground explosions.
Identifiers: Vela Uniform.

The second edition contains abstracts for approximately 2000 articles and reports on seismology and the detection of underground explosions. For this issue, the entries in the bibliography and all five addenda were edited and integrated along with approximately 200 new entries. The edition has three main parts, a subject-author-title list, abstracts of the publications cited, and a list of all VELA UNIFORM reports included in the bibliography. All three parts are arranged alphabetically by author. Each author of a publication with multiple authors is cross-referenced separately, but the complete reference and abstract are given only under the first-named author. Publications with no author credits are listed under the names of their corporate authors. Also included in this edition is a list of abbreviations used for journal titles. (Author)
AD-469 253 HC$3.00 MF$0.65

FOREIGN SCIENCE BULLETIN, VOL. 3, NO. 6, 1967.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 20E.
AD-655 339 HC$3.00 MF$0.65

LASA SIGNAL PROCESSING, SIMULATION, AND COMMUNICATIONS STUDY.
IBM Federal Systems Div Gaithersburg Md
For primary bibliographic entry see Field 17J.
AD-655 802 HC$3.00 MF$0.65

8L. Snow, Ice, and Permafrost

REPORT OF THE ARCTIC ICE OBSERVING AND FORECASTING PROGRAM-1965.
Special publication.
Naval Oceanographic Office Washington D C
May 67, 173p Rept no. NOO-SP-70 (65)
Availability: Hard copy available from Naval Oceanographic Office, Washington, D. C., 20390, $2.00.

Descriptors: (*Ice, *Arctic regions), Oceanographic data, Weather forecasting, Maps, Periodic variations, Tables.

The ice program conducted primarily in support of 1965 Military Sea Transportation Service arctic operations by the U.S. Naval Oceanographic Office is covered by this report. Methods of collection and dissemination of ice data, ice forecasting, forecast verification, and various allied ice projects

are discussed. Ice conditions in the North American Arctic are summarized graphically for 6-day periods from January through December. (Author)
AD-655 231 MF$0.65

THE EXTREME WINTER BOUNDARY OF ICE IN FAR EASTERN SEAS.
Naval Oceanographic Office Washington D C
N. P. Bulgakov. 1967, 18p Rept no. NOO-Trans-292
TT-67-62296
Predelnaya Zimnaya Granitsa Ldov v Dalnevostochnykh Moryakh, trans. of Okeanologicheskie Issledovaniya (USSR), n13 p66-76 1965.

Descriptors: (*Sea ice, *Oceanology), Periodic variations, Sea water, Convection (Atmospheric), Maps, Compressive properties, Temperature, USSR.

The study is made of the extreme sea-ice edge in the Far East seas during the winter months when the ice-area in the sea reaches its maximum. The fact was elicited, that the winter extreme limit of sea ice has a good connection with the configuration of the continental slope. The calculations of the critical convection depths disclosed the influence of North Pacific in compressibility of sea water at this depth. It may be asserted that the winter extreme limit of sea ice coincides with the configuration of the slope because there is a sharp increase of the critical depth of the thermal convection in this area. The schematic maps of the ice edge in winter and the critical depth of thermal convection in summer are given in this paper. (Author)
AD-655 235 HC$3.00 MF$0.65

STRATIGRAPHIC ANALYSIS OF A DEEP ICE CORE FROM GREENLAND.
Cold Regions Research and Engineering Lab Hanover N H
For primary bibliographic entry see Field 8G.
AD-655 264 HC$3.00 MF$0.65

SOME MECHANICAL PROPERTIES OF ALPINE SNOW, MONTANA 1964-66.
Research rept.,
Cold Regions Research and Engineering Lab Hanover N H
C. M. Keeler, and W. F. Weeks. Mar 67, 48p
Rept no. CRREL-RR-227

Descriptors: (*Snow, Montana), Mountains, Hardness, Tensile properties, Density, Mechanical properties, Physical properties, Scattering, Measurement, Site selection, Structural properties, Bonding, Porosity.

Data on the physical properties of seasonal alpine snow have been collected from the Beartooth Mountains near Cooke City, Montana, and the Bridger Range near Bozeman, Montana. Systematic measurements of snow density, temperature, structure, ram and Canadian hardness, centrifugal tensile strength and shear strength measured with a shear box and several types of shear vanes are included. Test results were grouped according to gross snow types and whether the snow was wet or dry. Interrelations between the different test parameters were studied. Experiments were also conducted to study the sources of error in making in-situ mechanical tests on snow without utilizing a pit wall. The main factor contributing to the experimental scatter is lateral inhomogeneity in the snow cover. However, the standard deviation of a group of strength tests is shown to be directly proportional to the mean value of the group. The systematic relations between snow properties invariably become obscured when different snow 'types' are indiscriminantly grouped together.
AD-655 528 HC$3.00 MF$0.65

8M. Soil Mechanics

MEASUREMENT OF THE COMPLEX MODULI AND DAMPING OF SOILS UNDER DYNAMIC LOADS. LABORATORY TEST APPARATUS PROCEDURE AND ANALYSIS.
Technical rept.,
Cold Regions Research and Engineering Lab., Hanover, N. H.
Henry W. Stevens. Apr 66, 44p TR-173

Descriptors: (*Soils, Modulus of elasticity), (*Damping, Soils), Measurement, Vibration, Loading (Mechanics), Structural properties, Test methods, Physical properties, Density, Moisture, Equations of motion, Dynamics, Viscoelasticity, Mechanical properties, Foundations (Structures).

A laboratory method is described which is currently being used to investigate the required soil properties necessary in solving foundation design problems for facilities that incorporate dynamic or vibration loading within the structure and have extremely high stability requirements. Emphasis is placed on the test apparatus, nomenclature, and the analysis and computation of the test results. It has been determined that the moduli and damping vary with soil physical conditions (density, water content, degree of saturation, etc.), STATIC LOAD CONDITIONS (vertical and lateral pressures), and dynamic loading conditions (frequency, drive force, and drive amplitude).
AD-484 956 HC$3.00

DRAINAGE CHARACTERISTICS OF BASE COURSE MATERIALS LABORATORY INVESTIGATION.
Technical rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
E. H. Nettles, and C. C. Calhoun, Jr. Jul 67, 76p
Rept no. TR-3-786
Research sponsored by Office, Chief of Engineers, U. S. Army.
Availability: Hard copy available from Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Descriptors: (*Soil mechanics, Drainage), Permeability, Porosity, Foundations (Structures), Construction materials, Roads, Experimental data.

A laboratory investigation of the effects of high degrees of compaction on the drainage characteristics (i.e., permeability and effective porosity) of coarse-grained base course materials was made to provide data for improving subsurface drainage design criteria. The investigation included the development of constant-head permeability test procedures for determining the coefficient of permeability of coarse-grained materials. In developing the test procedures, the effects of the following factors on permeability test results were investigated: compaction method, specimen size, compaction water content, method of saturating specimen, hydraulic gradient, rearrangement of particles, and temperature of the permeating water. Specimens of four gradations of base course materials were tested at densities ranging between 90 and 110 percent of their respective CE-55 maximum dry densities (modified AASHO). The results of the investigation indicated that the permeability of the three coarser grained materials varied with density and hydraulic gradient, except at the higher densities. The permeability of the fourth (finest) mater l varied with density but not with hydraulic gradient. Results of effective porosity tests indicated that the effective porosity of a material decreases with increase in density and with increase in percentage of fines. The results of the investigation indicated that when the materials containing 5 percent or more of material passing the No. 200 sieve are compacted to high densities, they generally will not meet established drainage criteria. (Author)
AD-655 505 MF$0.65

8N. Terrestrial Magnetism

AN EXPERIMENT WITH THE CONSTRUCTION OF A GEOMAGNETIC MAP FROM DATA OF AN ARTIFICIAL EARTH SATELLITE.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8B.
AD-655 702 HC$3.00 MF$0.65

SIGNIFICANCE OF EPEIROGENETIC CURVES FOR THE INTERPRETATION OF SPACIAL DISTRIBUTION OF THE GEOMAGNETIC FIELD.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8G.
AD-655 703 HC$3.00 MF$0.65

DETERMINATION OF MAGNETIZATION (DENSITY) OF ROCKS COMPOSING RELIEF, ACCORDING TO MAGNETIC (GRAVITATIONAL) SURVEY.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8G.
AD-655 705 HC$3.00 MF$0.65

EULER POTENTIALS AND GEOMAGNETIC DRIFT SHELLS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
D. Stern. Jul 67, 26p NASA-TM-X-55832, X-641-67-329

Descriptors: *Euler equation, *Geomagnet field, *Particle motion, *Potential theory, Drift, Field, Geomagnetic, Geophysics, Motion, Particle, Perturbation, Potential, Shell, Theory.

For abstract, see STAR 05 17.
N67-31339 HC$3.00 MF$0.65

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

APPLIED RESEARCH IN THIN-FILM FIELD-EMISSION TUBES.
Quarterly progress rept. no. 5, 1 Oct-31 Dec 63, Stanford Research Inst., Menlo Park, Calif.
L. Heynick, W. W. Hansen, and H. S. Crafts. Jan 64, 26p Rept. no. 18
Contract DA-36-039-AMC-00004 (E)

Descriptors: (*Electron tubes, Microminiaturization (Electronics)), (*Electron bombardment, Photons), Manufacturing methods, Molybdenum, Aluminum compounds, Oxides, Effectiveness, Dielectrics, Diodes (Electron tubes), Vapor plating, Vacuum apparatus, Films, Instrumentation.

Experimental work on photon generation by electron bombardment of dielectrics was resumed, for possible application to photon coupling between micron-size devices. An alternative, simplified procedure for producing interim, operable, micron-size diodes has been formulated, to provide vehicles for encapsulation studies. Experimental work has been started on several phases of this approach. Further developmental work was done on materials-evaporation rate-control techniques. Satisfactory operation of servo-control loop, involving an RF heater and a quadrupole mass spectrometer, was achieved, but shielding of the RF heater within the ultra-vacuum chamber is neces-

sary to avoid interference with the spectrometer. (Author)
AD-439 660 HC$3.00

LARGE-AREA ELECTRONIC DISPLAY PANEL.
Quarterly progress rept. no. 10, 1 Sep-30 Nov 64,
General Electric Co., Syracuse, N. Y.
R. B. Gethmann, A. W. Edson, and M. L. Noble.
30 Nov 64, 96p
Contract DA-36-039-sc-90755
See also AD-451 545 and AD-622 406.

Descriptors: (*Display systems, Electronic equipment), Diffraction, Thermoplastics, Electron guns, Resolution, Films, Optical equipment, Lenses, Tests, Electron optics, Photographic recording systems, Electromagnetic lenses.

The objective of this project is to advance the state-of-the-art of Large-Area Electronic Display by developing a new high-resolution electron-beam deformation system for thermoplastic film and a novel optical projection system. The optical design for the Model C TIRP objective is complete. This objective should resolve a 3,000 line record over all but the extreme corners of the 50 x 50 mm format. The system is well corrected over the major portion of the visible spectrum and should have a transmission exceeding 40%. Electron optical development has yielded great improvement in beam current. With a newly designed cathode lens the GMG Electron Gun has approached the required performance goals. The State-Of-The-Art Electron Gun is being used for system check-out. Sensitivity and spatial frequency data are being generated for the electron gun-thermop stic combination. Development of the system for dynamic corrective waveform generation is showing good results. Most of the circuits are complete. The dual roving circle tube has successfully generated both astigmatism functions and a third signal which when squared yields dynamic focus. (Author)
AD-458 029 HC$3.00

OSCILLATORS UTILIZING SUPERCONDUCTING RESONATORS,
Texas Univ Austin Dept of Electrical Engineering
J. L. Stone, and W. H. Hartwig. 1967, 11p
AFOSR-67-1587
Grant AF-AFOSR-766-67
Availability: Published in 1967 SWIEEECO Record nF-72 p9-3-1-8 Apr 19 1967.

Descriptors: (*Oscillators, *Superconductors), (*Supe onductivity, *Resonators), Helium, Liquefied gases, Cryogenics, Magnetic fields, Resistance (Electrical), Penetration, Transmission lines, Thermal expansion.

An oscillator employing a lumped parameter, superconducting L-C tank circuit resonant at 30 MHz is described. Frequency variations as a function of temperature are presented in the range from room temperature to below liquid helium temperature. The utility of this oscillator for studying surface reactance properties of superconductors is stressed.
AD-655 215 Not available from CFSTI.

INVESTIGATION OF LOW WEIGHT FOCUSING SCHEMES FOR TRAVELING-WAVE TUBE AMPLIFIERS.
Quarterly rept. no. 3, 15 Jan-14 Apr 67,
Watkins-Johnson Co Palo Alto Calif
J. N. Nelson. 12 May 67, 28p
ECOM-025 -3
Contract DA-28-043-AMC-02578 (E)
See also AD-655 001.

Descriptors: (*Traveling-wave tubes, *Focusing), Magnets, X band, Power, Magnetic fields, Voltage, Frequency, Design, Performance (Engineering), Tables.

The report describes the third quarter results on a program concerned with the investigation of lightweight focusing schemes for low-noise TWT amplifiers. These results are of significance because they represent an advance in low-noise, X-band TWT technology and show some important effects of reversed-field focusing on solid and hollow beams. The results show that a noise figure less than 6.0 dB, a gain greater than 30 dB, and an output power greater than 10 mW can be achieved at X-band frequencies with a solid-beam tube focused in a lightweight, 3.4 pound, single-reversal permanent magnet. The results also show that a noise figure less than 5.0 dB, a gain greater than 20 dB, and a power output greater than 0.5 mW can be achieved at X-band with a lightweight, 6.4 pound, straight-field permanent magnet. A high magnetic field is necessary to achieve lowest noise performance in a SRPM. Unfortunately, this causes velocity spread effects which seriously degrade the gain and power output of the tube. The best means for minimizing the velocity spread without increasing the noise figure is to employ a low gamma a, high voltage helix design. A low voltage, low current density, hollow-beam tube gives lower noise figure than higher voltage solid-beam tubes. However, a hollow beam collapses when it passes through a sudden field reversal. This causes a drastic fall off in gain and power. The utility of a low noise, hollow beam SRPM tube awaits evaluation of a severed helix design which incorporates a high gamma a input helix and a low gamma a output helix. (Author)
AD-655 272 HC$3.00 MF$0.65

DEVELOPMENT OF TRANSMITTER TUBE FOR TROPOSCATTER APPLICATIONS.
Triannual rept. no. 2, 1 Oct 66-31 Jan 67,
Hughes Aircraft Co Torrance Calif Electron Dynamics Div
Thomas B. Brown, Otto G. Sauseng, Gorden A. Lange, and J. C. Dixon. Apr 67, 54p Rept no. W-2275-2
ECOM-02316-2
Contract DA-28-043-AMC-02316 (E)

Descriptors: (*Transmit-receive tubes, *Amplifiers), Nucleate boiling, Cooling, Efficiency, C band, Design, Voltage, Computer programs, X band, Traveling-wave tubes.

The program objective is to determine the design criteria for a highly efficient (50% overall including focusing and cooling power) 10 kW CW traveling-wave amplifier at C-band and to demonstrate a feasibility model of the device. This amplifier is to have 11 dB of gain to boost the output of existing 1 kW troposcatter systems using power generators readily available. Techniques to improve the efficiency by reducing the power necessary to cool the device are an integral part of the program. Improvement in basic tube efficiency is to be accomplished by voltage jump tapering -- a recently developed technique which has demonstrated over 60% efficiency in an experimental traveling-wave amplifier. Cooling efficiency will be improved by utilizing vapor phase (nucleate boiling) cooling, eliminating the need for a coolant pump. (Author)
AD-655 277 HC$3.00 MF$0.65

DEVELOPMENT OF LINEAR POWER TUBES.
Interim development rept. 17 Feb-16 May 67,
Eimac San Carlos Calif
William H. Sain. 20 Jun 67, 55p
Contract N00024-67-C-1044
See also AD-650 614.

Descriptors: (*Tetrodes, Ultrahigh frequency), (*Beam power tubes, Linear systems), Distortion, Modulation, Performance (Engineering), Radiofrequency power, Electron tube parts.

UHF tetrode (oxide cathode) designs were optimized to achieve the required intermodulation distortion product ratios of -45 db, or better, third and fifth order, with minimum idling current and with better than 50 per cent plate circuit efficiency. Further information was obtained on the relationships between tube geometry and linearity performance. The range of idling current for optimum linear performance has been defined for two different tube geometries. Experiments were performed in a continuously pumped vacuum system on a moveable electrode planar model approximation of a (Th-W filamentary emitter) cylindrical tetrode. Intermodulation distortion evaluations were conducted and are reported as a function of electrode geometry. The audio frequency measurement techniques which were employed gave results substantially in agreement with 2 Mc measurements. (Author)
AD-655 291 HC$3.00 MF$0.65

THE NEGATIVE GAMMA VARACTOR,
Massachusetts Inst of Tech Lexington Lincoln Lab
Alfred I. Grayzel. 13 Jan 67, 3p Rept no. JA-2971
ESD-TR-67-307
Contract AF 19 (628)-5167
Availability: Published in Proceedings of the IEEE v55 n3 p469-70 Mar 1967.

Descriptors: (*Varactor diodes, *Frequency converters), Efficiency, Radiofrequency power, Performance (Engineering).

The letter gives efficiency and power handling capacities of frequency doublers and up-converters for negative values of gamma where S (V) = V to the 1/gamma power. It is shown that negative values of gamma yield greater efficiencies than varactors with gamma = 1/2, 1/3, and 0 which are commonly used. (Author)
AD-655 317 Not available from CFSTI.

AN INVESTIGATION OF USEFUL CONNECTIONS OF TWO TRANSISTORS,
Johns Hopkins Univ Silver Spring Md Applied Lab
R. G. King, and A. J. Cote, Jr. 28 Oct 57, 63p
Rept no. CF-2690
Contract NOrd-7386

Descriptors: (*Transistors, *Circuits), Power, Frequency, Tables, Voltage, Electric currents, Gain, Measurement.

In the design of transistor circuits there are many parameters to be considered. Among the most important of these are power gain and impedance. Also such features as stability and interchangeability of parts must be considered in any design. For specific circuits, certain individualistic characteristics arise, such as the ability to control gain automatically (AGC). In addition, desireability and effects of neutralization must sometimes be considered. It is the purpose of this investigation to attempt to answer these questions. (Author)
AD-655 416 HC$3.00 MF$0.65

CURRENT SATURATION AND DRAIN CONDUCTANCE OF JUNCTION-GATE FIELD-EFFECT TRANSISTORS.
Revised ed.,
Illinois Univ Urbana Dept of Electrical Engineering
S. Y. Wu, and C. T. Sah. 15 Dec 66, 19p
AFOSR-67-1629
Contract SD-131, Grant AF-AFOSR-714-67
Doctoral thesis. Revision of manuscript submitted 19 Oct 66.
Availability: Published in Solid-State Electronics v10 p593-609 1967.

Descriptors: (*Field effect transistors, Electric currents), Theory, Electrical conductance.

The current saturation phenomena in junction-gate-field-effect transistors is studied both theoretically and experimentally. The theory is based on a two section model with appropriate matching of the solutions at the boundary of the two sections. Two impurity profiles are studied (the ab-

rupt or step-step and the linearly graded-step double gate junctions). Comparisons of experiments with theory for L/D ratios of 10 and 1.5 show good agreements. (L=channel length and D=channel width). (Author)
AD-655 492 Not available from CSTI.

STUDY OF CROSSED-FIELD ELECTRON DEVICES.
Semiannual progress rept. no. 1, 26 Oct-15 Mar 67,
Michigan Univ Ann Arbor Electron Physics Lab
N. A. Masnari, K. F. Morman, J. E. Rowe, and A. Singh. Jun 67, 42p
ECOM-0093-1
Contract DAAB07-67-C-0093

Descriptors: (*Crossed field devices, Performance (Engineering)), Noise (Radio), Electron beams, Electron guns, Cyclotron waves, Interactions, Microwave amplifiers.

The crossed-field noise investigations are concerned with the generation of noise and the characteristics of the beam during the transient interval. The propagation of velocity and current fluctuations along the beam is considered for various regions of a crossed-field device. The formulation of an adequate coupled-mode theory for the gun region has been considered. Velocity-jump noise transformers are considered for use in relatively high-power crossed-field amplifiers. The vacuum system for the crossed-field amplifier has been completely renovated and initial testing indicates that pressures of 5 x 10 to the minus 8th power Torr can be achieved during cathode activation. The abbreviated Kino gun is being tested in the beam analyzer. The aperture-deflection plate system for monitoring current density and velocity of electrons has been located at the exit plane of the gun. Initial investigations indicate that the system in general performs in the desired manner. More detailed investigations are needed to evaluate the accuracy of the system. (Author)
AD-655 509 HC$3.00 MF$0.65

MODERN VHF FILTER CRYSTALS.
Technical rept.,
Army Electronics Command Fort Monmouth NJ
T. Lukaszek, A. Ballate, and H. Wasshausen. Apr 67, 34p Rept no. ECOM-2813

Descriptors: (*Crystals, *Crystal filters), Very high frequency, Quartz, Piezoelectric crystals, Quartz resonators.

With the advent of the trapped energy theory and experiments in which the electrode thickness was incorporated as an additional design criterion, design data are now available which permits the production of VHF filter crystals with a wide range of equivalent electric circuit parameters. It has been shown that in order to achieve consistent results when employing this technique, two factors must be rigorously adhered to: (1) a high degree of accuracy must be maintained in the plating operation and (2) deviation from plate parallelism must be held to a minimum. The necessity of developing modern filter crystals in the VHF range is well dramatized in Figure 17 by showing the extent to which the crystal filter capabilities have been extended. In addition to the benefits which are obtained in the suppression of unwanted modes there is some indication that crystal Q can also be improved. Since the number of crystals measured possessing extremely parallel surfaces was limited, this data should not be taken as conclusive, but only to open the door to additional investigations of crystal Q-plate parallelism correlation. (Author)
AD-655 532 HC$3.00 MF$0.65

EFFECTS OF MULTIPLE PATHS ON ACOUSTICAL SIGNALS.
Tufts Univ Medford Mass Dept of Mechanical Engineering
For primary bibliographic entry see Field 20A.
AD-655 637 HC$3.00 MF$0.65

AN EMPIRICAL STUDY OF ELF AND VLF SHIELD CANS,
Navy Underwater Sound Lab New London Conn
J. Ronald Moser. 23 May 67, 77p Rept no. USL-801

Descriptors: (*Electromagnetic shielding, Containers), Effectiveness, Stainless steel, Aluminum, Copper, Steel, Nickel alloys, Iron alloys.

An empirical ELF and VLF study of 1/16- and 1/32-inch-thick shield cans (stainless steel, aluminum, copper, Polyform, annealed Hipernom, and annealed and unannealed cold-rolled steel, mumetal, and Co-Netic) was performed to investigate shielding effectiveness versus frequency characteristics with emphasis on the effects of machining (notches, slots, holes, and louvers), dropping, annealing, welding, and disk grinding. The erratic nature of many of the shielding functions is explained by the resonance theory of shielding, and the shielding characteristics of certain shield cans are compared. The report also presents a brief introduction to the automated testing system used during this study to obtain the numerous shielding effectiveness versus frequency curves that were required. (Author)
AD-655 644 HC$3.00 MF$0.65

A TAPERED-LINE 3-DB COUPLER.
Final rept. 13 Jun-13 Nov 66,
Bendix Corp Southfield Mich Research Labs Div
C. P. Tresselt. 13 Nov 66, 42p Rept no. 3772
Contract N123 (62738)56114A

Descriptors: (*Waveguide couplers, Broadband), Ultrahigh frequency, Superhigh frequency, Design, Standing wave ratios, Performance (Engineering).

The report describes the design and fabrication of a 800-11,000 MHz high-isolation 90 degree coupler employing tapered-line techniques.
AD-655 655 HC$3.00 MF$0.65

INTERPRETATION OF LOW-VOLTAGE PHOTOMEASUREMENTS IN METAL-INSULATOR-METAL FILMS.
Air Force Avionics Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20C.
AD-655 686 Not available from CFSTI.

DIELECTRIC RELAXATION EFFECTS IN A METAL-OXIDE-PLASMA CAPACITOR.
Revised ed.,
Air Force Avionics Lab Wright-Patterson AFB Ohio
Robert A. Olson, and G. Medicus. 18 Nov 66, 5p Rept no. AFAL-TR-67-49
Revision of manuscript submitted 14 Jun 66.
Availability: Published in Applied Physics Letters v10 n1 p27-9 Jan 1 1967.

Descriptors: (*Capacitors, Dielectric properties), Relaxation time, Metals, Oxides, Plasma medium, Aluminum compounds, Scattering.

Measurements of k (*)C sub g, the complex dielectric constant k (*) times the geometrical capacity C sub g, of a metal-oxide-plasma capacitor have shown that k (*) exhibits dispersion in the audio frequency range. A series of dielectric relaxation spectra has been obtained for Al2O3 layers (anodized) by varying the plasma density. The dependence of the spectra on plasma density and oxide thickness is indicative of Maxwell-Wagner behavior. A Cole-Cole representation of the data shows a broadening of the dispersion toward low frequency with a secondary dispersion process appearing at low frequency. The main dispersion can be described by an empirical dispersion formula which represents an asymmetrical distribution of relaxation processes. The secondary dispersion may result from a very low frequency dispersion of the admittance components of the plasma sheath or from charge migration in the oxide. (Author)
AD-655 687 Not available from CFSTI.

AC SUPERCONDUCTING SOLENOID FOR KILOGAUSS FIELD MODULATION,
Revised ed.,
Massachusetts Inst of Tech Cambridge National Magnet Lab
Stephen Kurtin, Simon Foner, and Edward J. McNiff, Jr. 2 Dec 66, 4p Rept no. JP-223
AFOSR-67-1681
Contract F44620-67-C-0047
Revision of manuscript received 10 Nov 66.
Availability: Published in Review of Scientific Instruments v38 n5 p600-1 May 1967.

Descriptors: (*Solenoids, Superconductivity), Modulation, Magnets, Cryogenics, Wire, Niobium alloys, Zirconium alloys.

The design of an ac superconducting solenoid capable of producing oscillatory magnetic fields having peak-to-peak amplitudes as large as 1000 G at frequencies up to 500 Hz with only moderate dissipation is discussed. It is shown that a simple, inefficient coil geometry (thin solenoid) is suitable. Tests with an ac superconducting solenoid used as a modulation coil in a 60 kG superconducting magnet are described. Results indicate that the performance of copper at 4.2 K is far surpassed by Nb-25% Zr over a wide range of operating conditions. (Author)
AD-655 740 Not available from CFSTI.

RANDOM SCATTERING OF QUASIMONOCHROMATIC RADIATION IN A LONG TRANSMISSION LINE.
Physical sciences research papers no. 329,
Air Force Cambridge Research Labs L G Hanscom Field Mass
Joseph L. Poirier. Jun 67, 28p Rept no. AFCRL-67-0353

Descriptors: (*Transmission lines, Scattering), Probability density functions, Coherent radiation, Reflection, Propagation, Electromagnetic waves, Signals, Graphics.

The reflection of quasimonochromatic radiation from random discontinuities in a long transmission line is analyzed using the theory of partial coherence. Graphical probability density functions for the power reflection coefficient at the input to the line are obtained as a function of the spectral characteristics of the illuminating signal, the properties of the propagation medium, and the distribution of the scatterers. Theoretical expressions for the mean and variance of the power reflection coefficient are also obtained. The mean, variance, and probability density functions for the power reflection coefficient obtained experimentally are compared with the theoretical results and show good agreement. (Author)
AD-655 789 HC$3.00 MF$0.65

MUTUAL COUPLING STUDY,
Massachusetts Inst of Tech Lexington Lincoln Lab
George F. Farrell, Jr. 31 Mar 67, 60p
ESD-TR-67-279
Contract AF 19 (628)-5167
Prepared in cooperation with General Electric Co., Syracuse, N. Y. Heavy Military Electronics Dept. Research supported in part by ARPA Order-498.

Descriptors: (*Waveguide couplers ,*Phased arrays), Antenna components, Admittance, Waveguides, Polarization, Wave transmission.

The report gives the complete derivation (in an appendix) of the radiation admittance of a rectangular waveguide acting as an element in an infinite phased array. The derived equations are capable of predicting the experimentally observed anomalous notch that has been found to exist in arrays composed of large waveguides. The defining equations demonstrate that it is the existence of nonpropagating higher order modes inside the element waveguides that determine the behavior of an infinite array. It was the purpose of this study to determine what waveguide modes were important for a reasonably confident prediction of the radiation admittance of a rectangular waveguide in an array. It is shown that the number of modes needed for this is not excessively great, but that more are needed if it is desired to predict the position of an anomalous notch with any great degree of confidence. (Author)
AD-655 800 HC$3.00 MF$0.65

MATHEMATICAL INVESTIGATIONS OF SEMICONDUCTOR DEVICES.
Final rept. 1 Apr 66-1 Apr 67,
International Business Machines Corp Hopewell Junction N Y East Fishkill Facility
D. P. Kennedy. Apr 67, 134p Rept no. IBM-TR-22.422
AFCRL-66-358 (II)
Contract AF 19 (628)-5072

Descriptors: (* Semiconductor devices, Mathematical analysis), Field effect transistors, Space charges, Carriers (Semiconductors), Impurities, Voltage, Semiconductors, Interfaces.

The report covers a mathematical analysis of the mechanisms of operation with a Small Current Amplifying Device (SCAD). The analysis is in two spatial variables and includes the mixed boundary conditions encountered in a practical semiconductor device. Computer calculated distributions are graphically illustrated to show the space-charge and voltage drop within a source-drain channel, at equilibrium and also throughout a range of biasing conditions. Included in this report is a detailed one-dimensional analysis of the linearly-graded p-n junction. This analysis discusses several modes of operation not characterized by the depletion layer theory: for example, forward bias and reverse bias collector junction operation. A detailed comparison is presented between the results of this rigorous computational investigation, and the results obtained by other authors using more approximate methods of mathematical analysis. (Author)
AD-655 803 HC$3.00 MF$0.65

R AND D OF THE TECHNOLOGIES REQUIRED TO DESIGN AND FABRICATE ULTRAHIGH-SPEED COMPUTER SYSTEMS.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 9B.
AD-655 804 HC$3.00 MF$0.65

LONGTERM LIFE EXPECTANCY RESEARCH OF P-N-P ALLOYED GE TRANSISTORS.
Langfristige Lebensdaueruntersuchunge n An P-n-p-legierten Ge-transistoren
Eidgenossische Technische Hochschule, Zurich (Switzerland).
C. Villalaz. 1966, 289p DISS-3866
in German

Descriptors: * Fatigue life, * Germanium alloy, * Junction transistor, * P-n-p junction, Alloy, Device, Encapsulation, Fatigue, Germanium, Instability, Junction, Leakage, Life, Result, Stress, Temperature, Test, Time, Transistor, Voltage.

For abstract, see STAR 05 17.
N67-30755 HC$3.00 MF$0.65

NUMERICAL DETERMINATION OF THE STATISTICAL GRAPHS OF A THREE-LAYER SILICON POWER DIODE FROM NO-LOAD TO SHORT-CIRCUIT USING A DIGITAL COMPUTER.
Numerische Berechung Der Statischen Kennlinie Einer Dreischicht-silizium-leistungsdiode Von Leerlauf Bis Kurzschluss Mit Hilfe Eines Digitalen Computers
Eidgenossische Technische Hochschule, Zurich (Switzerland).
C. Iselin. 1966, 114p PROM-3727
in German

Descriptors: * Carrier injection, * Junction diode, * Theoretical physics, Carrier, Charge, Concentration, Current, Density, Diode, Electrode, Electronics, Injection, Junction, Line, Parallel, Physics, Plane, Semiconductor, Space, Surface, Theoretical.

For abstract, see STAR 05 17.
N67-30757 HC$3.00 MF$0.65

PREPARATION OF PLATINUM-FREE SILVER HALIDE ELECTRODES.
Izgotovleniye Besplatinovykh Galogenidosere-Bryanykh Elektrodov
Holman (John F.) and Co., Inc., Washington, D.C.
V. B. Aleskovskiy, and A. L. Bystritskiy. Jul 67, 4p NASA-TT-F-11085
Contract NASW-1495
Transl. Into English From Izv. Vyssh. Ucheb. Zaved., Khim. I Khim. Tekhnol. (Moscow), V. 7, No. 1, 1964 P 168-169

Descriptors: * Electrode, * Polymethyl methacrylate, * Silver halide, Chloride, Conductor, Copper, Electroplating, Free, Halide, Ion, Machining, Methacrylate, Plastic, Platinum, Polymethyl, Preparation, Silver, Solution, Water, Wire.

For abstract, see STAR 05 17.
N67-30862 HC$3.00 MF$0.65

MODIFICATION OF MAGNETRON CUT-OFF CHARACTERISTICS BY THE INTRODUCTION OF POSITIVE IONS.
Weapons Research Establishment, Salisbury (Australia).
For primary bibliographic entry see Field 9C.
For abstract, see STAR 05 17.
N67-31046 HC$3.00 MF$0.65

THE DEVELOPMENT OF WIDEBAND WAVEGUIDE-MOUNTED FERRITE-PENCIL PHASE SHIFTERS FOR X-BAND.
Royal Aircraft Establishment, Farnborough (England).
B. A. Hodgson. Oct 66, 58p RAE-TR-66337

Descriptors: * Ferrite, * Phase-shift keying, * Wideband communication, * X-band, Communication, Component, Experiment, Field, Impedance, Keying, Magnetic, Magnetization, Measurement, Microwave, Permeability, Phase, Shift, Transmission, Waveguide, Wideband.

For abstract, see STAR 05 17.
N67-31078 HC$3.00 MF$0.65

IMPROVED MICROPOWER LOGIC CIRCUITS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. C. Sturman. Jul 67, 23p NASA-TN-D-4052
Contract 125-25-02-01-22

Descriptors: * Logic circuit, * Power supply, * Temperature effect, * Transistor circuit, Circuit, Computer, Consumption, Design, Diode, Effect, Element, Gate, Logic, Power, Program, Pulse, Rate, Supply, Temperature, Transistor, Voltage.

For abstract, see STAR 05 17.
N67-31194 HC$3.00 MF$0.65

SOME VECTOR GENERATING TECHNIQUES FOR CATHODE RAY TUBE (CRT) DISPLAY.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
H. R. Durbeck. Jun 67, 33p NASA-TM-X-55828, X-521-67-271

Descriptors: * Cathode ray tube, * Display system, * Vector analysis, Analysis, Cathode, Display, Electric, Electron beam, Generation, Mathematics, Positioning, Ray, Stroke, System, Tube, Vector.

For abstract, see STAR 05 17.
N67-31302 HC$3.00 MF$0.65

APPROXIMATIONS TO OPTIMAL NON-LINEAR FILTERS.
Brown Univ., Providence, R. I.
H. J. Kushner. 1967, 50p NASA-CR-85852
Contracts NGR-40-002-015, AF-AFOSR-693-66

Descriptors: * Differential equation, * Finite difference method, * Nonlinear filter, * Stochastic process, Approximation, Correlation, Difference, Differential, Equation, Filter, Gaussian noise, Method, Noise, Nonlinear, Problem, Process, Signal, Solution, Statistics, Stochastic.

For abstract, see STAR 05 17.
N67-31463 HC$3.00 MF$0.65

9B. Computers

FACTOR FILE CONVERSION,
National Resource Evaluation Center, Washington, D. C.
John Bastyczak, Sarah Retherford, and A. Robert. Jun 64, 18p TM-144-Rev-1
Supersedes rept. dated June 63.

Descriptors: (* Programming (Computers), Handbooks), Computer storage devices, Computer programs.
Identifiers: PARM Program.

The revision of NREC Technical Manual No. 144 (PARM10 - Factor File Conversion) supersedes the manual dated June 1963, due to the fact that several modifications have been made to the Factor File Conversion Routine. The areas of the program which have been modified deal with the table parameters, the activity parameters, and the ancillary vector factors. The purpose of the Factor File Conversion computer program is to convert factor records from their maintenance format into the format required for computation. The inputs to the routine are a file of factor records in maintenance format (PARMMF tape), and either one or two j*j concordance files (PARMJJ tapes). The output from the routine is a file of factor records in computational format (PARMCF) for use by the PARM central routine. Section V-A5 of the PARM Formulation Manual provides guidance in the use of the program. (Author)
AD-447 860 HC$3.00

A REVIEW OF SELECTED METHODS OF MACHINE MANIPULATION OF CHEMICAL STRUCTURES,
General Electric Co., Huntsville, Ala. Computer Dept.
For primary bibliographic entry see Field 5B.
AD-451 700 HC$3.00

A COLLECTION OF ALGORITHMS FOR SEARCHING CHEMICAL COMPOUND STRUCTURE ANALOGS,

General Electric Co., Huntsville, Ala. Computer Dept.
For primary bibliographic entry see Field 5B.
AD-460 819 HC$3.00

HIGH SPEED DISPLAY OF CHEMICAL NOMENCLATURE, MOLECULAR FORMULA AND STRUCTURAL DIAGRAM,
General Electric Co., Huntsville, Ala. Computer Dept.
For primary bibliographic entry see Field 5B.
AD-460 820 HC$3.00

THE GENERATION OF RANDOM NUMBERS FROM VARIOUS PROBABILITY DISTRIBUTIONS.
Naval Postgraduate School, Monterey, Calif.
For primary bibliographic entry see Field 12A.
AD-475 568 HC$3.00 MF$0.65

THE USE OF COMPUTERS IN SPEECH RESEARCH,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 17B.
AD-655 206 Not available from CFSTI.

A FORTRAN PROGRAM FOR THE CALCULATION OF COMPRESSIBLE LAMINAR BOUNDARY LAYERS,
New York Univ N Y Dept of Aeronautics and Astronautics
For primary bibliographic entry see Field 20D.
AD-655 237 HC$3.00 MF$0.65

ANIP FLIGHT PATH GENERATOR FINAL REPORT AND MAINTENANCE INSTRUCTIONS: PHASE II.
Douglas Aircraft Co Inc El Segundo Calif
For primary bibliographic entry see Field 14B.
AD-655 298 HC$3.00 MF$0.65

MICROPOWER REDUNDANT CIRCUITS CORRECT ERRORS AUTOMATICALLY,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 9E.
AD-655 313 Not available from CFSTI.

A STANDARD METHOD FOR THE SYNTHESIS OF FINITE AUTOMATA WITHOUT STORAGE, WITH SEVERAL OUTPUTS, CONSTRUCTED FROM STATIC SWITCHING ELEMENTS,
Foreign Technology Div Wright-Patterson AFB Ohio
S. Basarab. 10 Mar 67, 15p Rept no. FTD-HT-66-484
TT-67-62357
O Metoda Tip de Sinteza a Automatelor Finite fara Memorie, cu Mai Multe Iesiri, Realizate cu Elemente de Conutatie Statica, edited trans. of Automatica si Electronica (Rumania), v9 n2 p76-80 1965.

Descriptors: (*Input-output devices, Synthesis), Automata, Rumania, Automation, Data processing systems.

The article presents an optimal method for the construction of finite memoryless automata with multiple inputs and multiple outputs, starting with static switching elements of the 'Nor' type. Both the principle of the method and its practical application (i.e., the calculations involved) are discussed.
AD-655 348 HC$3.00 MF$0.65

MEMORY ELEMENT BASED ON A BIAX CORE,
Foreign Technology Div Wright-Patterson AFB Ohio
Yu. I. Vizun, I. A. Efimov, and L. G. Tarasov.
28 Feb 67, 6p Rept no. FTD-HT-67-39
Unedited rough draft trans. of Patent (USSR) 164 462, appl. no. 840436/26-24, 5 Jun 63.

Descriptors: (*Computer storage devices, Magnetic core storage), Signal-to-noise ratio.
Identifiers: Biax.

The report describes a biax core. The output winding is passed through one of the openings of the core. Both the interrogation winding and the recording winding are passed through the other core winding.
AD-655 355 HC$3.00 MF$0.65

FREQUENCY PROGRAMMER AND DECODER.
Final technical rept. Jan 66-Jan 67,
Rome Air Development Center Griffiss AFB NY
Alfred S. Kobos. Jun 67, 42p Rept no. RADC-TR-67-152

Descriptors: (*Programming (Computers), *Decoding), Pulse systems, Bandwidth, Theory, Probability, Errors, Detection, Frequency, Equations, Performance (Engineering), Coding.

A technique for encoding 5 information bits into an eight-frequency symbol was implemented and tested. Data at a 62.5 kilobit/second rate is converted into output frequencies each of which is 2 microseconds in duration. Approximately 10 MHz of bandwidth is required for transmission. The performance of this system was determined in the laboratory, using additive gaussian noise for a channel. Error probabilities were measured for the binary data. The experimental results are compared to the theoretical performance of a noncoherent detector for M-ary signals. A brief discussion of the equations used to obtain the theoretical curves is presented. The encoding process is described in detail and the decision process employed is shown to be less efficient than the optimum possible one. The relationship of the binary error rate to the 32-ary symbol error rate is described. (Author)
AD-655 372 HC$3.00 MF$0.65

A COMPUTER SIMULATION EXPERIMENT OF SUPERVISORY CONTROL OF REMOTE MANIPULATION.
Massachusetts Inst of Tech Cambridge Engineering Projects Lab
For primary bibliographic entry see Field 5H.
AD-655 375 HC$3.00 MF$0.65

TIME SHARED COMPUTERS,
Carnegie Inst of Tech Pittsburgh Pa
C. Gordon Bell. 15 May 67, 95p
AFOSR-67-1618
Contract SD-146

Descriptors: (*Time sharing, Data processing systems), Real time, Automation, Scheduling, Algorithms, Programming (Computers).
Identifiers: Multiprogramming, Computer hardware, Computer software.

Time-sharing is discussed generally to include any application of a computer system which has simultaneous users. The discussion emphasizes the general purpose time-sharing, since special purpose time-sharing, 'real time', and 'on line' systems are a subset. 'Graceful Creation', or the 'boot strapping' of a system, is described in which newly created individual user procedures are immediately available to the whole community of users, and the system expands in an open-ended fashion because many users contribute to the formation. (Author)
AD-655 380 HC$3.00 MF$0.65

INVESTIGATION OF LOGIC CIRCUIT COMPLEXES: UNIVERSAL FUNCTION MODULES.
Final rept. 16 Mar 66-15 Mar 67,
Sperry Rand Corp Philadelphia Pa UNIVAC Div
James T. Ellison, Bernard Kolman, and Anthony P. Schiavo. 15 Apr 67, 82p
AFCRL-67-0243
Contract AF 19 (628)-6012

Descriptors: (*Logic circuits, Modules (Electronics)), Reliability (Electronics), Redundant components, Decoding, Computer logic, Gates (Circuits).

The paper formulates and deals with some problems in universal function modules. A universal function module (UFM) is a variable logic structure capable of performing any function of n variables. The function performed by a UFM may be determined either by external switching or by a permutation of inputs, yielding fixed-connection and variable-connection UFMs, respectively. Among certain subclasses of these structures, optimal realizations are developed with respect to cost and reliability. Two new structures are discussed, one having active redundancy and correcting any single fault and the other possessing passive redundancy and correcting any two faults. Finally, the effect that passage of time has on redundant systems is considered, with special attention to triplication. It is shown that triplication and related reliability-increasing techniques actually decrease the expected time-to-failure of a system. (Author)
AD-655 395 HC$3.00 MF$0.65

AN ADAPTIVE THRESHOLD LOGIC GATE USING CAPACITIVE ANALOG WEIGHTS,
Texas Univ Austin Dept of Electrical Engineering
John R. Smith, Jr., and Cyrus O. Harbourt. 1967; 11p
AFOSR-67-1593
Grant AF-AFOSR-766-67
Availability: Published in 1967 SWIEEECO Record nF-72 p22-2-1-8 Apr 19 1967.

Descriptors: (*Logic circuits, *Gates (Circuits)), Adaptive systems, Computer storage devices, Analog systems, Capacitors, Stabilization.

An all-electronic realization of an adaptive threshold logic gate is presented. The memory for each weight of the device is a capacitor voltage stabilized by a sampling technique. Over the range of stabilization the average capacitor current is zero at a discrete number of stable voltages which are numerous enough to approximate analog memory. The weights are long-term stable and easy to adjust. Training results are given for several linearly separable switching functions. In integrated form this circuit would greatly increase the feasibility of building more complex trainable machines. (Author)
AD-655 403 Not available from CFSTI.

FILTER DESIGN FOR THE AVERAGE RESPONSE COMPUTER,
Texas Univ Austin Dept of Electrical Engineering
For primary bibliographic entry see Field 9E.
AD-655 404 Not available from CFSTI.

ANALYST ASSISTANCE PROGRAM (AAP) FOR ON-LINE COMPUTATIONS VIA 2250 GRAPHICAL TERMINALS CONNECTED TO AN IBM 360/40 COMPUTER.
Technical memorandum,
Naval Weapons Lab Dahlgren Va
Anne B. Ammerman. Mar 67, 55p Rept no. NWL-TM-K-28/67

Descriptors: (*Programming languages, *Computer programs), (*Programming (Computers), *Flow charting), Monitors, Scanning, Cathode ray tubes, Display systems, Systems engineering, Graphics.

The memorandum describes the implementation and utility of a computational tool called Analyst

Assistance Program (AAP). AAP is a conversational computing facility used for performing small non-recurring numerical computations. The language was designed to make it possible for non-programmers to learn and use the system with a minimal amount of instruction (10-15 minutes). The system is implemented on an IBM 360/40 computer which consist of two user consoles, each with a cathode ray tube display, light pen and low speed printer.
AD-655 443 HC$3.00 MF$0.65

FORTRAN IV COMPUTER PROGRAMS FOR MARKOV CHAIN EXPERIMENTS IN GEOLOGY.
Northwestern Univ Evanston Ill Dept of Geology
For primary bibliographic entry see Field 8G.
AD-655 447 HC$3.00 MF$0.65

AUTOMATED DATA PROCESSING AND CONTROL SYSTEM FOR TEST EQUIPMENT.
Naval Avionics Facility Indianapolis Ind
For primary bibliographic entry see Field 5A.
AD-655 469 HC$3.00 MF$0.65

COMPUTERIZED VISIBILITY CALCULATIONS MAXIMUM SIGHTING RANGE PROGRAM.
Scripps Institution of Oceanography San Diego Calif Visibility Lab
For primary bibliographic entry see Field 6P.
AD-655 470 HC$3.00 MF$0.65

A DESCRIPTIVE LIST OF PLATO PROGRAMS.
Revised ed.,
Illinois Univ Urbana Coordinated Science Lab
Elisabeth R. Lyman. Jul 67, 8p Rept no. R-296
Contracts DA-28-043-AMC-00073 (E), Nonr-3985 (08)
Supersedes AD-634 593. Research supported in part by U.S. Office of Education.

Descriptors: (*Teaching machines, *Programmed instruction), Programming (Computers), Computer logic, Teaching methods, Digital computers, Learning.
Identifiers: PLATO programs.

The report supersedes CSL Report R-186 and CSL Report R-296 (June, 1966). It lists with brief descriptions the teaching lesson sequences which have been using tutorial logics, inquiry logics, or combinations thereof. The version of the PLATO system for which the lessons were written is specified in each instance. PLATO I and PLATO II lessons are no longer operable because the PLATO I and PLATO II systems are now obsolete, but several of these lessons have been rewritten for the present version of the software and hardware, PLATO III.
AD-655 503 HC$3.00 MF$0.65

SIMPLIFICATION OF THE COVERING PROBLEM FOR MULTIPLE OUTPUT LOGICAL NETWORKS.
Revised ed.,
Ohio State Univ Research Foundation Columbus
B. B. Gordon, R. W. House, A. P. Lechler, L. D. Nelson, and T. Rado. 27 May 66, 10p
AROD-1685:25
Grants DA-ARO (D)-31-124-G312, DA-ARO (D)-31-124-G589
Revision of manuscript submitted 3 Dec 65. Prepared in cooperation with Battelle Memorial Inst., Columbus.
Availability: Published in IEEE Transactions on Electronic Computers vEC-15 n6 p891-7 Dec 1966.

Descriptors: (*Computer logic, *Optimization), Logic circuits, Diodes, Special functions (Mathematical).

The paper is concerned with the problem of determining diode optimal representations for two levels of logic with multiple inputs and multiple outputs. Previous papers by the authors and others have formulated algorithms for obtaining optimal representations. However, the linear integer programming problem obtained is often prohibitively large. In the present paper, methods for reducing the size of the problem before and after expanding into the linear integer format are presented. These methods insure that at least one optimal representation for the system is retained after each reduction. Examples are given. (Author)
AD-655 536 Not available from CFSTI.

ELECTROCHEMICAL DATA ACQUISITION AND ANALYSIS SYSTEM BASED ON A DIGITAL COMPUTER.
California Inst of Tech Pasadena Gates and Crellin Labs of Chemistry
For primary bibliographic entry see Field 7D.
AD-655 541 Not available from CFSTI.

A GENERAL PURPOSE VIDEO INPUT DEVICE FOR A DIGITAL COMPUTER.
Final technical rept.,
Bolt Beranek and Newman Inc Cambridge Mass
Theodore R. Strollo, and Warren Teitelman. 21 Jul 67, 48p Rept no. BBN-1537
Contract Nonr-4758 (00)

Descriptors: (*Input-output devices, Digital computers), (*Character recognition, Data processing systems), Real time, Time sharing, Pattern recognition, Data storage systems, Cameras.
Identifiers: Image dissector camera system.

A general purpose video input device was acquired and interfaced to a digital computer. Time-shared access to this device was provided in real-time. The device was then used to provide input for a hand written character recognition scheme.
AD-655 642 HC$3.00 MF$0.65

DEVELOPMENT OF A SELF-ADAPTIVE MODEL REFERENCE AUTOMATIC CONTROL SYSTEM.
Final rept.,
Naval Ship Engineering Center Philadelphia Pa Philadelphia Div
P. H. Zavod. 26 Jun 67, 43p Rept no. NAVSEC-PHILADIV-C-5-1

Descriptors: (*Adaptive control systems, Automatic), Optimization, Control systems, Feasibility studies, Analog computers.

Automatically controlled systems frequently employ proportional plus integral devices as the controller in the closed loop. The determination of the optimum values of the coefficients of the proportional and integral terms is normally accomplished by trial and error procedures. In an effort to obviate this procedure, a method was developed to compute the optimum values of gain and integration constant of a conventional proportional plus integral controller using an analog computer operating iteratively and in fast time. The results of this computation were applied directly to the settings of a controller in a closed loop system operating in real time. The speed of the optimization process was such that the optimum controller settings were determined for a disturbance after the disturbance had taken place but before the process had responded to any significant degree. (Author)
AD-655 658 HC$3.00 MF$0.65

NOSY: A CORE-SAVING OPERATING SYSTEM,
Rand Corp Santa Monica Calif
Ivan L. Finkle, and H. L. Scantlin. Jul 67, 11p Rept no. P-3168/1

Descriptors: (*Magnetic core storage, Data processing systems), (*Programming (Computers), Magnetic core storage), Efficiency, Input-output devices, Coding, Computer storage devices.
Identifiers: IBM 7044, NOSY.

This paper describes an operating system for the IBM 7044 which provides more core storage for the programmer than is available when using the IBM system IBSYS. This is achieved by sacrificing efficiency of input/output; and the system should be used only for programs which cannot run under IBSYS because of core storage requirements. This reflects a drastic change in RAND's computer system: originally an IBM 7040 coupled to a 7044, it now has been reduced to the latter machine. Input and output devices are tape units; tapes are processed by an IBM 360/30.
AD-655 760 HC$3.00 MF$0.65

SOVIET CYBERNETICS: RECENT NEWS ITEMS NO. 6,
Rand Corp Santa Monica Calif
Wade B. Holland. Jul 67, 95p Rept no. P-3600/6 TT-67-62346
Consists of various articles selected from Russian periodicals and newspapers. See also AD-653 937.

Descriptors: (*Computers, USSR), (*Cybernetics, USSR), Programming languages, Automation, Information theory, Coding, Data processing systems, Reviews, Management planning.
Identifiers: Light pens.

Contents: Brief items; The BESM-3M computer; More on MINSK-222, Novosibirsk computer systems work; Computer design activity in ARMENIA; Kiev management information system; Light pen; Problems in Soviet computer industry: 3 articles for historical perspective: Problems itemized by experts; Dorodnitsyn on the hardware problem; Glushkov on economic cybernetics; RITM computer; Book review: A Report On Computers in Russia; Articles and photographs in the Soviet press, June 1967.
AD-655 761 HC$3.00 MF$0.65

AUTOMATED INPUT/OUTPUT DIAGNOSTICS FOR A REAL-TIME SIMULATION RESEARCH SYSTEM.
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 5I.
AD-655 771 HC$3.00 MF$0.65

EIGENELEMENTS OF THE FINITE FOURIER TRANSFORM AND THEIR APPLICATION TO ANTENNA PATTERN SYNTHESIS,
Hughes Aircraft Co Culver City Calif Antenna Dept
For primary bibliographic entry see Field 20N.
AD-655 791 HC$3.00 MF$0.65

R AND D OF THE TECHNOLOGIES REQUIRED TO DESIGN AND FABRICATE ULTRAHIGH-SPEED COMPUTER SYSTEMS.
Interim rept. no. 11, 1 Jan-30 Mar 67.
Massachusetts Inst of Tech Lexington Lincoln Lab
Mar 67, 21p
ESD-TR-67-316
Contract AF 19 (628)-5167
Prepared in cooperation with Philco-Ford Corp., Blue Bell, Pa., Microelectronics Div. See also AD-650 628.

Descriptors: (*Digital computers, Design), (*Logic circuits, Digital computers), (*Microminiaturization (Electronics), Logic circuits), Manufacturing methods, Computer logic, Silicon.

A description is given of the work performed during the third quarter of the research and development program 'R and D of the Technologies Required to Design and Fabricate Ultrahigh-Speed

Group 9B—Computers

Computer Systems.' The fabrication and evaluation phases of the 3-, 9-, and 27-bit parity arrays continued. The completed SMX6 and SMX7 high-speed ECL microcircuit gate designs were not fabricated but instead were replaced by two new designs, the SMX8 and SMX9. (Author)
AD-655 804 HC$3.00 MF$0.65

AN ASSOCIATIVE PROCESSING SYSTEM FOR CONVENTIONAL DIGITAL COMPUTERS.
Technical note,
Massachusetts Inst of Tech Lexington Lincoln Lab
P. D. Rovner, and J. A. Feldman. 21 Apr 67, 36p
Rept no. TN-1967-19
ESD-TR-67-242
Contract AF 19 (628)-5167, ARPA Order-691

Descriptors: (*Programming languages, Digital computers), (*Pattern recognition, Digital computers), Information retrieval, Coding, Computer programs, Time sharing.
Identifiers: Algol, Associative processor, Associative retrieval.

A user-oriented system having both algebraic and associative processing capabilities is presented in this report. The algebraic capabilities are essentially those of ALGOL. The associative facilities are: (1) A language for the expression of associative retrieval requests (the associative language). (2) A scheme for the internal representation of a store of associations between items of information (an associative information base). (3) Processing routines for associative retrieval requests. The associative language is independent of the structure of the associative information base. In the system presented here, the associative information base is implemented via hash-coding techniques. The associative language is implemented by extending an existing ALGOL system. This report consists of three sections: Sec. I describes the high-level programming language for the overall system; Sec. II outlines the scheme for representing an associative information base; and Sec. III summarizes the processing routines for associative retrieval requests. (Author)
AD-655 810 HC$3.00 MF$0.65

THE VISUAL IMAGE PROCESSOR.
Technical rept.,
Illinois Univ Urbana Biological Computer Lab
John K. Russell. May 67, 129p Rept no. TR-11
AFOSR-67-1665
Contract AF 33 (615)-3890, Grant AF-AFOSR-7-67

Descriptors: (*Data processing systems, Pattern recognition), Optical images, Processing, Storage tubes, Computers, Data storage systems, Logic circuits, Control systems, Circuits.

An electronic computer which operates on two-dimensional visual images is described. The Visual Image Processor (V.I.P.) is designed to compute on data obtained from image points and their near neighbors. The number of types of computations which can be performed is very large: computation with both digital (quantized) and analog (continuous) signals is possible. The heart of the computer is three cathode-ray electrostatic storage tubes, used as the data storage system. Computation is performed by combining video signals obtained by simultaneously offset-scanning the images recorded in two tubes and writing the outcome of operations performed on the two signals as the newly created image in a third tube. This computing process can be repeated indefinitely if noise considerations are minimized. An algorithm for a possible corner detection scheme is developed to study the variety and kind of operations that arise in parallel computation and which suggests specifications for the V.I.P. Decisions are made in the systems planning and all electronic circuitry used in the V.I.P. are described in detail, as are the tests used to measure its performance. Recommendations are made for further improvement in the performance of the machine. (Author)
AD-655 842 HC$3.00 MF$0.65

ITEM PROGRAM MANUAL, FORTRAN IV VERSION.
Analytical Mechanics Associates, Westbury, N.Y.
L. Lefton, N. Levine, F. Whitlock, and H. Wolf.
May 67, 96p NASA-CR-85705, REPT.-67-9
Contract NAS5-9085

Descriptors: *Encke method, *Fortran, *Orbit calculation, Calculation, Computer, Drag, Earth, Effect, Field, Gravity, Harmonic, Mars, Moon, Orbit, Perturbation, Pressure, Program, Radiation, Shadow, Sun, Tesseral, Thrust, Venus, Zone.

For abstract, see STAR 05 17.
N67-30919 HC$3.00 MF$0.65

A COMPUTER SIMULATION OF DIGITAL RECORDING QUARTERLY PROGRESS REPORT, 29 DEC. 1966 - 31 MAR. 1967.
Ampex Corp., Redwood City, Calif. Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
J. C. Mallinson. 29 Apr 67, 19p NASA-CR-84878, RR-67-12
Contracts NAS7-100, JPL-951785
Prepared for Jpl

Descriptors: *Computer program, *Digital simulation, *Magnetic tape recorder, Computer, Digital, Fourier series, Fourier transform, Gap, Head, Isolation, Length, Magnetic, Program, Pulse, Recorder, Reproduction, Simulation, Single, Tape, Transition, Waveform.

For abstract, see STAR 05 17.
N67-30921 HC$3.00 MF$0.65

EUMPSS 16 K BAND "MULTIPERIC SUPERVISOR SYSTEM" - DESCRIPTION AND DIRECTIONS FOR USE.
Eumpss 16k Bande "multiperipheric Supervisor System" Description Et Mode D'emploi
European Atomic Energy Community, Ispra (Italy).
J. Pire, and L. Sangermano. Mar 67, 19p EUR-3295.F
in French, English Summary

Descriptors: *Computer program, *Feedback control system, Analysis, Computer, Condensation, Control, Deck, Error, Executive, Feedback, Memory, Multiparameter, Program, Support, System, Unit, Utility.

For abstract, see STAR 05 17.
N67-31063 HC$3.00 MF$0.65

SOLID-STATE SHUNT STABILIZER CIRCUITS FOR THE MERCURY COMPUTER.
Royal Aircraft Establishment, Farnborough (England).
I. B. Piggott, and K. Sanderson. Dec 66, 19p
RAE-TR-66390

Descriptors: *Current stabilizer, *Digital computer, *Power supply, *Shunt, *Solid state device, Amplifier, Circuit, Computer, Control, Current, Device, Digital, Mercury, Power, Regulator, Solid, Stabilizer, State, Supply, Thermionic, Valve.

For abstract, see STAR 05 17.
N67-31079 HC$3.00 MF$0.65

9C. Electronic and Electrical Engineering

DETERMINATION OF ELECTRON DENSITY USING THE MICROWAVE CAVITY TECHNIQUE,
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
For primary bibliographic entry see Field 20I.
AD-271 880 HC$3.00

TRANSIENT ELECTRICAL VOLTAGES IN MILITARY TRACKED VEHICLES.
Army Electronics Command Fort Monmouth NJ
For primary bibliographic entry see Field 10B.
AD-655 533 HC$3.00 MF$0.65

RESPONSE CHARACTERISTICS OF A SAVONIUS ROTOR CURRENT METER.
Technical rept.,
Woods Hole Oceanographic Institution Mass
Nick P. Fofonoff, and Yucel Ercan. Jun 67, 91p
Rept no. WHOI-Ref-67-33
Contracts N00014-66-C-0241, Nonr-2196 (00)

Descriptors: (*Measuring devices (Electrical + electronic), *Electric currents), (*Sensors, *Impellers), Instrumentation, Calibration, Dynamics, Meters, Radiofrequency, Oceans, Velocity.
Identifiers: Savonius rotor current meter.

The steady-state and dynamic characteristics of the sensors in a Savonius rotor current meter are examined to evaluate the frequency response and precision of the instrument for current measurements. (Author)
AD-655 641 HC$3.00 MF$0.65

FUNCTIONAL EVALUATION OF ELECTROLUMINESCENT PICTORIAL STATUS DISPLAYS.
North American Aviation Inc Anaheim Calif Autonetics Div
For primary bibliographic entry see Field 21D.
AD-655 690 HC$3.00 MF$0.65

THE TEMPERING OF A CONVERTER CONTROLLED SYNCHRONOUS MACHINE UNDER STRESS.
Das Anlassen Einer Stromrichtergesteuerten Synchronmaschine Unter Last
Eidgenossische Technische Hochschule, Zurich (Switzerland).
R. Doser. 1966, 137p DISS-3760
in German

Descriptors: *Dynamic load, *Electric current, *Induction system, *Synchronous motor, Alternating, Control, Converter, Current, Dynamic, Electric, Generator, Impulse, Induction, Load, Motor, Phase, Starting, Synchronous, System, Voltage.

For abstract, see STAR 05 17.
N67-30760 HC$3.00 MF$0.65

EVALUATION OF COMPENSATION METHOD FOR HYSTERESIS EFFECT IN SERIES-WOUND GENERATOR FOR INDUCTION MOTOR, AND FOR ADJUSTMENT OF ITS IDLING PHASE TO THE RESISTANCE OF THE TOTAL IGNITION CIRCUIT.
Untersuchung Eines Verfahrens Zur Zur Kompensation Der Hysteresewirkung Einer Hauptschlusserregten Erregermaschine Und Zur Anpassung Ihrer Leerlaufkennlinie An Den Widerstand des Gesamten Erregerkreises
Eidgenossische Technische Hochschule, Zurich (Switzerland).
A. G. Depinay. 1966, 112p PROM-3606
in German

Descriptors: *Hysteresis, *Induction system, *Synchronous motor, Circuit, Compensation, Current, Effect, Electricity, Generator, Impulse, Induction, Load, Motor, Phase, Rotor, Series, Synchronous, System, Voltage.

For abstract, see STAR 05 17.
N67-30763 HC$3.00 MF$0.65

STRUCTURE THEORY FOR THE REALIZATION OF FINITE STATE AUTOMATA PROGRESS REPORT, 1 NOV. 1966 - 30 APR. 1967.
Texas Univ., Austin. Dept. of Electrical Engineering.
C. L. Coates. 10 May 67, 53p NASA-CR-85590
Contract NGR-44-012-049

Descriptors: *Sequential machine, *Structure, Binary, Code, Finite, Flip-flop, Hazard, Logic, Machine, Network, Sequence, State, Storage, Synchronous; Theory, Threshold.

For abstract, see STAR 05 17.
N67-30801 HC$3.00 MF$0.65

MODIFICATION OF MAGNETRON CUT-OFF CHARACTERISTICS BY THE INTRODUCTION OF POSITIVE IONS.
Weapons Research Establishment, Salisbury (Australia).
E. H. Hirsch. Feb 67, 19p WRE-TN-CPD-122

Descriptors: *Cut-off, *High energy interaction, *Magnetron, Anode, Cathode, Cesium, Charge, Current, Distribution, Electron, Emission, Energy, Field, High, Interaction, Ion, Magnetic, Positive, Space.

For abstract, see STAR 05 17.
N67-31046 HC$3.00 MF$0.65

THE MAXIMUM RESPONSE OF SIMPLE BEAMS TO RANDOM EXCITATION.
Measurement Analysis Corp., Los Angeles, Calif.
R. L. Barnoski. Jul 67, 36p NASA-CR-816, MAC-504-17
Contract NAS8-20020

Descriptors: *Approximation method, *Dynamic response, *Problem solving, *Random vibration, *Statistical probability, *Structural beam, Analog, Approximation, Beam, Circuit, Correlation, Dependence, Dynamic, Empirical, Maximum, Method, Output, Prediction, Probability, Problem, Random, Response, Simulation, Solution, Space, Stationary, Statistical, Stochastic, Structural, Theory, Time, Vibration.

For abstract, see STAR 05 17.
N67-31430 HC$3.00 MF$0.65

9D. Information Theory

OPTIMAL ADAPTIVE FILTER REALIZATIONS FOR SAMPLE STOCHASTIC PROCESSES WITH AN UNKNOWN PARAMETER,
Texas Univ Austin Dept of Electrical Engineering
C. G. Hilborn, Jr., and D. G. Lainiotis. 1967, 11p
AFOSR-67-1586
Grant AF-AFOSR-766-67
Availability: Published in 1967 SWIEEECO Record nF-72 p1-4-1-8 Apr 19 1967.

Descriptors: (*Adaptive systems, Stochastic processes), (*Information theory, Stochastic processes), Sampling, Optimization, Probability, Statistical processes, Mathematical analysis, Linear systems.
Identifiers: Adaptive filters.

Techniques are given for realizing optimal learning systems for filtering a sampled stochastic process in the presence of an unknown constant or time varying parameter. It is shown how the non-linear Bayles optimal-quadratic sense-adaptive filters can be directly realized for continuous parameter spaces by real-time analogue systems. Examples are given for both constant and time varying unknown parameters.
AD-655 214 Not available from CFSTI.

TECHNICAL CYBERNETICS,
Foreign Technology Div Wright-Patterson AFB Ohio
L. P. Kraizmer. 24 Apr 67, 100p Rept no. FTD-MT-65-422
TT-67-62360
Tekhnicheskaya Kibernetika, edited machine trans. of Massovaya Radio Biblioteka (USSR) v542 88p 1964.

Descriptors: (*Information theory, *Cybernetics), Information retrieval, Data storage systems, Data transmission systems, Bionics, Control systems, Automatic, Computers, Computer logic, USSR.

The basic ideas of cybernetics are popularly expounded as the science of the general principles of control. Primary attention is allotted to technical cybernetics, questions of the control of technical processes, and the creation of artificial controlling systems consisting of devices for perception, transmission, storage, and processing of information. Elementary information from information theory is given as well as that on automatic adjustment and electronic computers. The possibilities of fulfillment by the latter of different logical functions are considered. A considerable quantity of practical applications of cybernetic technology is described both in the field of automation of control, calculation and planning, as well as in the field of simulation of physiological processes in living organisms. Broader materials are represented regarding information-logical machines, information converters, self-organized systems, and bionic methods of improving cybernetic technology.
AD-655 365 HC$3.00 MF$0.65

DETECTION OF PULSED SIGNALS IN NOISE. AN EXPERIMENTAL STUDY BASED ON THE MARCUM THEORY,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
J. L. MacArthur. 13 Feb 58, 17p Rept no. CF-2715
Contract NOrd-7386

Descriptors: (*Detection, Probability), (*Radiofrequency pulses, Detection), Radiofrequency interference, Experimental data, Signal-to-noise ratio, Statistical analysis.

In applications involving the detection of pulsed signals in random noise, the theoretical work of Marcum has proven useful. The calculation of detection probability as a function of signal-to-noise ratio and number of pulses integrated has been accomplished by Marcum and the data presented for a wide range of parameter variation. An experimental investigation was undertaken to verify the results of Marcum and to relate the assumptions and approximations contained in the theory to a practical embodiment. The instrumentation consisted of a simulated pulsed-radar receiver, scaled down in frequency for convenience, in which i-f pulses generated by gating the output of a CW oscillator were combined with random noise, bandpass filtered and square-law detected. The desired number of detected pulses were then added and applied to a threshold detector by means of which the probability of exceeding a given threshold could be determined. (Author)
AD-655 420 HC$3.00 MF$0.65

ON THE COEFFICIENTS OF A WIENER CANONICAL EXPANSION FOR THE LIKELIHOOD FUNCTION OF A CONTINUOUS MARTINGALE.
Technical rept.,
Information Research Associates Inc Lexington Mass
Donald B. Brick. 12 Jun 67, 21p Rept no. IRA-TR-10, IRA-102:13
AFOSR-67-1555
Contracts AF 49 (638)-1631, AF33 (615)-3758

Descriptors: (*Statistical analysis, *Stochastic processes), (*Information theory, Simulation), Pattern recognition, Theorems, Probability, Mathematical analysis.
Identifiers: Likelihood, Wiener canonical expansion.

Analytical forms for the coefficients and for the sum of the squares of the coefficients of a Wiener Canonical (Hermite-Laguerre) expansion of the likelihood function of a stochastic process may be readily obtained if that process is a zero initial-value stationary (wide-sense), orthogonal-increment continuous Martingale. These coefficients are simple functions of the parameter of the process, sigma (subscript o, superscript 2). It is shown that the coefficients containing odd subscripts vanish as expected, while if sigma (subscript o, superscript 2) = 1, all coefficients vanish except the first one (i.e., the coefficient for the zeroth order Hermite polynomials). This suggests a matching possibility, whereby the process' amplitude variation may be matched to the expansion. The expression for the asymptotic value of the coefficients for large order (index) is derived and is shown to behave as the inverse fourth root of the index. (Author)
AD-655 594 HC$3.00 MF$0.65

INFLUENCE OF FORMAT ON MESSAGE INFORMATION ENTROPY AND LOADING OF COMMUNICATION CHANNELS.
Research and development rept. Sep-Dec 66,
Navy Electronics Lab San Diego Calif
G. V. Nolde. 13 Apr 67, 27p Rept no. NEL-1451

Descriptors: (*Information theory, *Telegraph systems), Communication systems, Coding, Navy, Signals.

The work explores conversion of entire message fields each into a single code word. This report is one of three related reports on the subject of information entropy of messages in the communications of U. S. Navy ships. The entropy as such is the subject of the present report. The companion reports are concerned with utilization of the data derived in this report. The principal conclusions are as follows: (1) In a large class of Navy formatted messages, the format carriers about 66 percent of the text, but only 6.5 percent of its information content. Therefore, developing format for other classes of Navy messages is recommended. (2) Navy teletype language has more than 85-percent redundancy compared with asymptotic information content of the traffic; therefore, development of information converters is a promising endeavor. (Author)
AD-655 622 HC$3.00 MF$0.65

THE MEASUREMENT OF CORRELATION FUNCTIONS IN CORRELATORS USING "SHIFT-INVARIANT INDEPENDENT" FUNCTIONS.
Technische Hogeschool, Eindhoven (Netherlands).
J. B. Peek. 1967, 89p

Descriptors: *Correlation function, *Random signal, *Time function, Correlation, Correlator, Electronic, Function, Independence, Invariance, Measurement, Noise, Random, Ratio, Shift, Signal, Time.

For abstract, see STAR 05 17.
N67-30643 HC$3.00 MF$0.65

THE DETECTION OF MODULATED GAUSSIAN SIGNALS WITH APPLICATION TO THE SIMULATION OF CW RADAR RECEIVERS.

Weapons Research Establishment, Salisbury (Australia).
J. S. Allison. Feb 67, 26p WRE-TN-SAD-173

Descriptors: *Continuous wave (cw) radar, *Digital simulation, *Gaussian noise, *Radar receiver, *Signal detection, *Target recognition, Amplitude, Band, Continuous, Cw radar, Detection, Digital, Fast, Frequency, Gauss, Modulation, Narrow, Noise, Radar, Rayleigh distribution, Receiver, Recognition, Signal, Simulation, Target, Very low, Wave.

For abstract, see STAR 05 17.
N67-30679 HC$3.00 MF$0.65

A STUDY OF LEARNING SYSTEMS OPERATING IN UNKNOWN STATIONARY ENVIRONMENTS.
Technical rept.,
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
K. S. Fu, and Z. J. Nikolic. Nov 66, 127p TR-EE66-20
Grant NSF-GK-696

Descriptors: (*Pattern recognition, Statistical analysis), (*Learning, Mathematical models), Probability, Distribution functions, Adaptive systems, Algorithms, Stochastic processes, Control, Theses.

This study concerns problems of learning which confront the designers of learning control and statistical pattern recognition systems. Learning is considered to be a process of successive approximation or estimation of unknown parameters of a preselected function chosen by the designer to characterize the process under study. Stochastic approximations are used to describe the problems of learning in unknown time-discrete stationary environments. The procedures for the design of 'on-line' learning controllers for unknown time-discrete stationary stochastic plants are described. A unified procedure for the optimal design of both the receptor and the categorizer of a statistical pattern recognition machine is described.
PB-175 515 HC$3.00 MF$0.65

ON THE FINITE STOPPING RULES AND NONPARAMETRIC TECHNIQUES IN A FEATURE-ORDERED SEQUENTIAL RECOGNITION SYSTEM.
Technical rept.,
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
K. S. Fu, and Y. T. Chien. Oct 66, 119p TR-EE66-16
Grant NSF-GK-696

Descriptors: (*Pattern recognition, Mathematical analysis), Optimization, Dynamic programming, Character recognition, Flow charting, Optimization.

A class of sequential recognition problems in which the number of feature measurements required to assign class membership to each pattern sample depends on the outcome of the previous measurements is considered. The sequential recognition structure allows the categorizer to observe the feature measurements one at a time, and each time the decision of the categorizer consists of both the choice of closing the sequence of observations and making a terminal decision (namely, assigning class membership to a pattern sample) and the choice of taking another measurement before coming to a terminal decision. A merit of this recognition system is that specific decision procedures can be constructed so that, on the average, a substantially fewer number of measurements are required than the equally reliable nonsequential recognition procedures. The construction of finite stopping rule is first accomplished by considering a modified Wald's sequential probability ratio test in which a pair of time-varying (convergent) stopping boundaries is used to replace the constant boundaries in the original test. In addition to the finite stopping rules, the problem of designing a nonparametric sequential categorizer is investigated. Finally, a procedure for selecting and ordering the successive feature measurements observed by the sequential categorizer is given.
PB-175 516 HC$3.00 MF$0.65

ON GENERALIZATIONS OF ADAPTIVE ALGORITHMS AND APPLICATION OF THE FUZZY SETS CONCEPT TO PATTERN CLASSIFICATION,
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
K. S. Fu, and W. G. Wee. Jun 67, 144p TR-EE67-7
Grant NSF-GK-696

Descriptors: (*Pattern recognition, *Set theory), Algorithms, Theses, Learning, Automation, Iterative methods, Simulation.
Identifiers: Fuzzy set.

There are essentially three main investigations undertaken in this thesis: (1) The application of fuzzy sets concept to generate a set of discriminant functions for two pattern classes; (2) Generalizations of the adaptive procedures for the discriminant functions needed in (1); and, (3) The application of a fuzzy automation learning model to pattern classification problem.
PB-175 610 HC$3.00 MF$0.65

9E. Subsystems

PULSED MAGNETIC-FIELD MILLIMETER WAVE GENERATOR.
Report no. 10, 1 Mar-31 May 62.
Stanford Univ., Calif. Microwave Lab.
Jun 62, 42p ML-934
Contract DA-36-039-sc-85263

Descriptors: (*Ferromagnetic materials, *Pulse generators), (*Radiofrequency generators, Design), Direct current, Electromagnetism, Extremely high frequency, Ferrites, Fourier analysis, K band, Magnetic fields, Microwaves, Nuclear spins, Resonance, Single crystals, Yttrium compounds, Zinc compounds.

The study is of a pulsed magnetic-field millimeter wave generator using electron spin resonance in ferrites.
AD-283 034 HC$3.00

LARGE-AREA ELECTRONIC DISPLAY PANEL.
General Electric Co., Syracuse, N. Y.
For primary bibliographic entry see Field 9A.
AD-458 029 HC$3.00

RESEARCH ON COMPACT AND EFFICIENT ANTENNAS.
Rept. no. 1, 1 Jul-30 Oct 64,
Airborne Instruments Lab., Deer Park, N. Y.
J. F. Ramsey, B. V. Popovich, W. M. Mulqueen, W. J. McEvoy, and G. O. Nagel. 30 Oct 64, 168p
Contract DA-28-043-AMC-00281 (E)

Descriptors: (*Antenna configurations, Reports), Effectiveness, Impedance matching, Aircraft antennas, Ground vehicle antennas, Semiconductor devices, Cryogenics, Bibliographies, Patents, Portable, Mobile, High frequency, Very high frequency, Cooling.
Identifiers: Antennafiers.

The object of the research conducted under this contract is to determine whether techniques exist for raising the efficiency of electrically small and compact antennas used on aircraft, vehicle, and manpack communications equipment. A literature and patent search, and a state-of the-art review revealed the present status of small antenna technology, and indicated the directions on which further progress can be anticipated. Classical techniques of capacitive and inductive loading, of folding and arraying, and of ground decoupling, will receive further refinement. (Author)
AD-458 141 HC$3.00

THE APPLICATION OF INTEGRATED CIRCUITRY TO SPACECRAFT ELECTRONIC SYSTEMS,
Aerospace Corp., El Segundo, Calif. Technical Operations.
J. B. Bryson. Jan 65, 34p TOR-469 (9990)-4
Contract AF 04 (695)-469

Descriptors: (*Integrated circuits, Spacecraft), Electronic equipment, Semiconductor devices, Reviews, Design, Reliability (Electronics), Semiconducting films, Radiation damage, Transistors, Costs, Films.
Identifiers: Monolithic circuits.

The application of integrated circuitry to spacecraft electronic systems is analyzed. The performance and characteristics of state-of-the art integrated circuits, including reliability and radiation resistance, have been determined. Both analog and digital integrated circuitry is evaluated. A comparison of integrated techniques (monolithic, thin-film, and hybrid) is made for the various requirements of spacecraft systems. (Author)
AD-459 635 HC$3.00

CAMERA TUBE WITH INTERNAL IMAGE-MOTION COMPENSATION.
General Electric Co., Syracuse, N. Y. Pickup Tube Operation.
For primary bibliographic entry see Field 14E.
AD-470 058 HC$3.00 MF$0.65

THERMODYNAMICS OF FREQUENCY CONVERSION,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Paul Penfield, Jr. Apr 66, 13p
Contract DA-36-039-AMC-03200 (E)
Availability: Published in the Symposium on Generalized Networks at the Polytechnic Inst. of Brooklyn, N. Y., Apr 12-14 1966.

Descriptors: (*Frequency converters, Thermodynamics), Circuits, Theory, Heat engines.

Frequency converters that are physically realizable must obey the second law of thermodynamics. Brillouin has observed that a rectifier cannot be so perfect as to rectify thermal noise, since this would violate the second law. The simple lossless model of an ideal diode, with zero forward resistance and zero reverse conductance, is therefore not realizable, except in the limit of zero temperature. Reversible frequency converters coupled with appropriate filters and pumps can act as reversible heat engines or refrigerators, and of course obey the Carnot efficiency formulas. One such device is the nonlinear capacitor, which when operated as a heat engine obeys both the Carnot formulas and the Manley-Rowe formulas. It is hypothesized that all frequency converters that are reversible, in the thermodynamic sense, must obey the Manley-Rowe formulas. This result is not proven in general, but is demonstrated by means of a simple three-frequency model. Certain conditions, as yet unknown, about one's ability to interconnect various devices, restrict the generality. (Author)
AD-655 207 Not available from CFSTI.

OSCILLATORS UTILIZING SUPERCONDUCTING RESONATORS,
Texas Univ Austin Dept of Electrical Engineering
For primary bibliographic entry see Field 9A.
AD-655 215 Not available from CFSTI.

FALSE ALARM PROBABILITY OF A QUADRATURE CLIPPER CORRELATOR FOR A POISSON NOISE PROCESS.
Research rept., Sep 65-Jan 66,
Navy Electronics Lab San Diego Calif
C. S. Stradling. 28 Apr 67, 32p Rept no. NEL-1458

Descriptors: (*Correlators, Reliability (Electronics)), Bandwidth, Sonar signals, Processing, Statistical processes, Theorems, Integral transforms, Correlation techniques, Errors, Probability.

By means of a mathematical model, it was shown that the false alarm probability of a quadrature clipper correlator for a Poisson noise process is a function of both the noise bandwidth and the sampling rate. The same analytical technique is applicable to a wide variety of correlation systems which process data in clipped form. (Author)
AD-655 244 HC$3.00 MF$0.65

MICROPOWER REDUNDANT CIRCUITS CORRECT ERRORS AUTOMATICALLY,
Massachusetts Inst of Tech Lexington Lincoln Lab
Robert E. McMahon, and Nathaniel Childs. 1967, 5p Rept no. JA-2961
ESD-TR-67-314
Contract AF 19 (628)-5167
Availability: Published in Electronics p66-9 Feb 6 1967.

Descriptors: (*Redundant components, Integrated circuits), Shift registers, Errors, Corrections, Power, Pulse systems.

A new circuit error correcting technique has been applied to redundant system design. The use of integrated circuits and pulse power provides low power features and small size. (Author)
AD-655 313 Not available from CFSTI.

THE NEGATIVE GAMMA VARACTOR,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 9A.
AD-655 317 Not available from CFSTI.

DECOUPLED MONOPULSE EXCITATIONS FOR MAXIMUM GAIN WITH ARBITRARY SIDELOBE CONSTRAINTS,
General Electric Co Syracuse N Y Heavy Military Electronics Dept
Richard R. Kinsey. Apr 67, 64p Rept no. Scientific-1
AFCRL-67-0332
Contract AF 19 (628)-5905

Descriptors: (*Phased arrays, Antenna radiation patterns), Antenna lobes, Gain, Antenna feeds, Antenna apertures, Performance (Engineering).

Monopulse antenna patterns can be conveniently obtained by phase comparing the two halves of an equiphased line source aperture. The generally unsatisfactory sidelobe performance of this type antenna has, however, seriously limited its application. A mathematical derivation and physical interpretation of line source excitations which maximize sum gain, subject to sum and difference pattern sidelobe constraints, are presented in this report. A computer program to solve for the required excitation coefficients is outlined and the Fortran IV listing is appended. Numerical examples are included for a representative number of practical cases and one of the derived aperture excitations is selected as the design basis for an experimental linear array. A discussion of the array feed design is followed by a summary of laboratory and pattern range measurement data. (Author)
AD-655 391 HC$3.00 MF$0.65

INVESTIGATION OF LOGIC CIRCUIT COMPLEXES: UNIVERSAL FUNCTION MODULES.
Sperry Rand Corp Philadelphia Pa UNIVAC Div
For primary bibliographic entry see Field 9B.
AD-655 395 HC$3.00 MF$0.65

FILTER DESIGN FOR THE AVERAGE RESPONSE COMPUTER,
Texas Univ Austin Dept of Electrical Engineering
Robert H. Flake, and Jerome R. Cox, Jr. 1967, 11p
AFOSR-67-1623
Grant AF-AFOSR-766-67
Availability: Published in 1967 SWIEEECO RECORD nF-72 p11-5-1-9 Apr 19 1967.

Descriptors: (*Computers, Response), (*Low-pass filters, Performance (Engineering)), Design, Specifications, Biology, Medicine, Sampling, Interpolation, Calibration.

Performance and design specifications for filters used in the average response computer are discussed. Both the optimum Wiener filter and the simple low-pass R-C filter are considered, and their relative performance is compared for this special, biomedical computer application. Design curves are presented for the R-C filter parameters which minimize the root-mean-squared error when this filter is employed in the average response computer.
AD-655 404 Not available from CFSTI.

OPTIMAL COOPERATIVE RENDEZVOUS OF LINEAR SINGLE INPUT SYSTEMS,
Texas Univ Austin Dept of Electrical Engineering
D. H. Eller, J. K. Aggarwal, and T. E. Mueller. 1967, 10p
AFOSR-67-1592
Grant AF-AFOSR-766-67
Availability: Published in 1967 SWIEEECO Record nF-72 p4-5-1-7 Apr 19 1967.

Descriptors: (*Oscillators, *Feedback), (*Performance (Engineering), *Calculus of variations), Problem solving, Linear systems, Systems engineering, Control systems, Integral transforms, Differential equations, Combinatorial analysis.

In a study of cooperative optimal rendezvous strategies for controlled systems, a method is presented by which feedback controls for the systems may be found. A modification of this method is presented as well as an example problem comparing the results of the two methods.
AD-655 406 Not available from CFSTI.

A TRANSISTORIZED D. C. TO D. C. CONVERTER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
R. A. Freiberg, M. B. Greenlee, and I. B. Tice. 5 Feb 58, 22p Rept no. CF-2703
Contract NOrd-7386

Descriptors: (*DC to DC converters, Transistors), Design, Oscillators, Rectifiers, Circuits, Power supplies.

The report describes the evolution of a small, transistorized D. C. to D. C. converter for use with a transponding beacon. Because of space and power limitations, it was decided to use a transistorized square wave oscillator followed by appropriate rectifiers, filters, and regulating circuitry. (Author)
AD-655 415 HC$3.00 MF$0.65

PACKAGING DENSITY STUDY: ANALYSIS AND METHODS FOR 'BALL PARK' ESTIMATES OF PACKAGING EFFICIENCY,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 13D.
AD-655 417 HC$3.00 MF$0.65

A WIDE BAND TRANSISTOR I-F AMPLIFIER WITH AGC,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
T. Poehler, and J. Smith. 9 Oct 57, 22p Rept no. CF-2684
Contract NOrd-7386

Descriptors: (*Transistor amplifiers, *Intermediate frequency amplifiers), Broadband, Automatic gain control, Very high frequency, Design, Gain, Video amplifiers.

A 45 Mc transistor i-f amplifier designed with special emphasis on AGC considerations is described. The technique used was that of applying AGC voltage to video type stages to prevent distortion and nonlinearities usually present in the standard i-f amplifier with AGC. Analysis of the design and operation of the amplifier is for the most part carried out through use of pole-zero techniques. The completed amplifier had adequate gain and bandwidth coupled with desirable AGC characteristics. (Author)
AD-655 419 HC$3.00 MF$0.65

WIDE-RANGE AUTOMATIC GAIN CONTROL CIRCUIT FOR SUPERREGENERATIVE AMPLIFIERS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
John H. Kuck. 18 Dec 67, 65p Rept no. CF-2702
Contract NOrd-7386

Descriptors: (*Automatic gain control, *Circuits), (*Amplifiers, Automatic gain control), Broadband, Superregeneration, Pulse systems, Gain.

An automatic gain control (AGC) circuit for a pulsed superregenerative amplifier was devised, which features what is believed to be a novel principle of operation, that is, gain control by control of the width of the keying pulse. This principle converts the superregenerative amplifier into a very stable device, which will operate in the linear mode and will permit linear detection of signal modulation for a wide range of input signal levels. Satisfactory AGC action has been experimentally demonstrated for input signals having a dynamic range as great as ninety decibels. With this type of AGC the bandwidth and shape of the curve of frequency response to input signals and the shape of the gate rejection characteristic are independent of input signal level. This method of AGC is very flexible in that it appears to be readily adaptable to various types of oscillators and various frequency ranges. This versatility has been demonstrated by its application to grid-pulsed and plate-pulsed oscillators at 150 megacycles and to a klystron-type oscillator at X-band. Another feature which may be of importance is the fact that the AGC control characteristic is naturally a logarithmic function. Numerous graphs are given in the report relating to AGC characteristics, frequency response, and gate resolution of superregenerative amplifiers using the various types of oscillators which were tried with this AGC circuit. (Author)
AD-655 422 HC$3.00 MF$0.65

MODERN VHF FILTER CRYSTALS.
Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 9A.
AD-655 532 HC$3.00 MF$0.65

A TRANSISTORIZED LINEAR GATE,
Brandeis Univ Waltham Mass
A. P. Mills. 25 Jul 66, 9p
AROD-3389:13
Grant DA-ARO (D)-31-124-G877
Availability: Published in Nuclear Instruments and Methods v50 p132-6 1967.

Descriptors: (*Gates (Circuits), Transistors), Spectroscopy, Scintillation, Feedback, Performance (Engineering).

A linear gate for scintillation spectroscopy is described. 1/4% linearity, high temperature stability and small (0.03%) pedestal and feedthrough are achieved by negative feedback and subtraction of both signal and gate pulse error signals. Circuit details are given. (Author)
AD-655 551 Not available from CFSTI.

POWER TRANSFER BETWEEN ANTENNAS IN CLOSE PROXIMITY.
Final technical rept. (Part 1), 1 Jun 62-31 Aug 63,
Illinois Univ Urbana Antenna Lab
James R. Pace. Jan 64, 31p Rept no. TR-1
See also AD-655 657, pt. 2.

Descriptors: (*Antennas, Performance (Engineering)), Radiofrequency power, Antenna apertures, Gain, Differential equations, Coupling circuits.

The article discusses the theoretical determination of the power transfer between aperture antennas so closely coupled that one is located in the Fresnel region of the other. A new approach to calculating the fields in the Fresnel region is included. A series expansion for the power transfer between aperture antennas is derived. The Friis formula is given for the far-field power transfer. For the near-field or Fresnel region, a new gain factor is determined and substituted in the Friis formula in place of the far-field gain. A more fundamental approach uses a general integral representation for the power transfer, but the expressions can be integrated easily only when the antenna separation is such that the far-field approximation applies. To avoid these complicated integrals, a novel approach is described using a plane wave and a number of plane wave derivatives. An expression for the generalized transmission coefficient is derived. However, application to rectangular apertures shows that the formula is inadequate for close spacings of apertures, since it is written in terms of an infinite series which apparently diverges when antenna separation becomes small. (Author)
AD-655 656 HC$3.00 MF$0.65

BROADBAND ARRAYS OF HELICAL DIPOLES.
Final technical rept. (Part 2), 1 Jun 62-31 Aug 63,
Illinois Univ Urbana Antenna Lab
D. T. Stephenson, and P. E. Mayes. Jan 64, 65p
Rept no. TR-2
See also AD-655 656, pt. 1.

Descriptors: (*Antenna arrays, Log periodic antennas), Dipole antennas, Antenna components, Helixes, Performance (Engineering), Shipborne, High frequency, Gain, Electrical impedance, Broadband.

The report deals with the problem of reducing the resonant length of radiating elements of log-periodic dipole antenna arrays by the use of helical dipole elements. Some consideration is given also to the problem of boom length shortening. Reduced size log-periodic arrays are required to make practical shipborne applications in the high frequency band at frequencies as low as 8 MHz. Several reduced scale models were built using helical dipole elements and compared with similar designs using linear dipole elements. Directive gains and impedance characteristics were compared. An element shortening factor of 0.54 was used. Some mixed dipole arrays, where only the longer low frequency elements were shortened, also were tested. Conclusions are that helical dipoles are useful and practical size-reduced elements for log-periodic arrays. However, boom length is increased by dipole length shortening and antenna performance somewhat impaired. The most practical design is a log-periodic mixed dipole array. Measurement techniques are treated in an appendix. (Author)
AD-655 657 HC$3.00 MF$0.65

HANDBOOK OF DESIGN CRITERIA FOR MICROELECTRONIC SYSTEM PACKAGES. VOLUME I. PACKAGING SYSTEM METHODOLOGY. VOLUME II. PACKAGING SYSTEM DESIGN AND EVALUATION PROCEDURE.
Final rept. Nov 65-Jan 67,
Hughes Aircraft Co Fullerton Calif
Michael A. Merrigan. May 67, 180p
RADC-TR-67-125-Vol-1-2
Contract AF 30 (602)-3934
See also Volume 3a, AD-655 763.

Descriptors: (*Microminiaturization (Electronics), *Packaging), Handbooks, Design, Modules (Electronics).

Volume I, Packaging System Methodology, is intended as an introduction to the balance of the handbook and as a reference in clarifying unfamiliar terms encountered during its use. Volume II, Packaging System Design and Evaluation Procedure, establishes a method of defining design requirements, defines a packaging design procedure and describes a procedure of use in packaging design evaluation. (Author)
AD-655 762 HC$3.00 MF$0.65

HANDBOOK OF DESIGN CRITERIA FOR MICROELECTRONIC SYSTEM PACKAGES. VOLUME IIIA. DESIGN DATA.
Final rept. Nov 65-Jan 67,
Hughes Aircraft Co Fullerton Calif
Michael A. Merrigan. May 67, 183p
RADC-TR-67-125-Vol-3a
Contract AF 30 (602)-3934
See also Volumes 1 and 2, AD-655 762 and Volume 3b, AD-655 764.

Descriptors: (*Microminiaturization (Electronics), *Packaging), Handbooks, Design, Modules (Electronics), Data.

The volume contains design data for reference as a means of assisting the program manager and equipment designer in implementing the procedures described in Volume II (AD-655 762). These data includes general guidelines for accomplishing tasks and tabulated information to assist in making decisions during implementation of the procedures. (Author)
AD-655 763 HC$3.00 MF$0.65

HANDBOOK OF DESIGN CRITERIA FOR MICROELECTRONIC SYSTEM PACKAGES. VOLUME IIIB. DESIGN DATA.
Final rept. Nov 65-Jan 67,
Hughes Aircraft Co Fullerton Calif
Michael A. Merrigan. May 67, 384p
RADC-TR-67-125-Vol-3b
Contract AF 30 (602)-3934
See also Volume 3a, AD-655 763 and Volume 4, AD-655 765.

Descriptors: (*Microminiaturization (Electronics), *Packaging), Handbooks, Design, Modules (Electronics), Data.

The volume contains design data for reference as a means of assisting the program manager and equipment designer in implementing the procedures described in Volume II. These data include general guidelines for accomplishing tasks and tabulated information to assist in making decisions during implementation of the procedures. (Author)
AD-655 764 HC$3.00 MF$0.65

HANDBOOK OF DESIGN CRITERIA FOR MICROELECTRONIC SYSTEM PACKAGES. VOLUME IV. DESIGN EXAMPLE.
Final rept. Nov 65-Jan 67,
Hughes Aircraft Co El Segundo Calif
Michael A. Merrigan. May 67, 67p
RADC-TR-67-125-Vol-4
Contract AF 30 (602)-3934
See also Volume 3b, AD-655 764.

Descriptors: (*Microminiaturization (Electronics), *Packaging), Handbooks, Design, Modules (Electronics), Data.

The volume illustrates the use of the procedures and design data contained in the handbook by utilizing them to guide solution of a sample design problem. In this problem, the packaging design of an existing electronic equipment is revised to achieve more appropriately compliance with a new set of design requirements. This section may also be referenced as an aid in understanding the procedures defined in Volume II (AD-655 762). (Author)
AD-655 765 HC$3.00 MF$0.65

MICROWAVE RECTIFICATION USING QUARTZ.
Physical sciences research papers no. 319,
Air Force Cambridge Research Labs L G Hanscom Field Mass
Andrew James Slobodnik, Jr. Apr 67, 70p Rept no. AFCRL-67-0143
Master's thesis.

Descriptors: (*Rectifiers, Quartz), Piezoelectric crystals, Disks, Crystal rectifiers, Dry disk rectifiers, Microwave frequency, Microwave equipment, Theory, Demodulation.

The linear and nonlinear behavior of a thin piezoelectric quartz disk under microwave-frequency excitation is considered both theoretically and experimentally. A theory developed for X-cut quartz predicts the generation of a dc electric field and a corresponding dc voltage across the disk, owing to second-order coefficients in the piezoelectric constitutive relations. These second-order coefficients are assumed to be the dominant nonlinearities of the system. Temperature effects are neglected. Microwave acoustic resonances corresponding to high harmonics of the fundamental elastic standing wave were observed for X-cut and AC-cut quartz disks, in excellent agreement with the linear theory. Equivalent-circuit methods for description and measurement of these resonances are given. An equivalent circuit describing the nonlinear dc behavior of the disk derived for a simple model. This circuit consists of a voltage source in series with a capacitance. The open-circuit voltage is a product of the second-order coefficients and the square of the magnitude of the applied electric displacement field, and is in addition dependent on the applied microwave frequency. With a simple model used for the external network, the measurable voltage associated with the effect was determined. Direct comparison of theory and experiment was not possible since the model could not be applied to explain several observed effects. Microwave rectification has been achieved, however, by means of both polished and fine-ground X-cut quartz disks placed in the gap of a highly reentrant S-band microwave cavity. (Author)
AD-655 776 HC$3.00 MF$0.65

A SHORT-CUT METHOD OF COMPUTING THE BRUNE AND BOTT-DUFFIN CIRCUIT REALIZATIONS OF POSITIVE REAL BI-ORDER IMMITTANCE FUNCTIONS.
Physical sciences research papers no. 320,
Air Force Cambridge Research Labs L G Hanscom Field Mass
Kurt H. Haase. Apr 67, 67p Rept no. AFCRL-67-0136

Descriptors: (*Circuits, Synthesis), Electrical networks, Electrical impedance, Admittance, Functions, Transformations (Mathematics).
Identifiers: Brune synthesis.

The paper presents a novel technique for computing the elements of the Brune realization and of

the Bott-Duffin realization of a bi-order-n and positive real immittance function F (s) = N (s)/D (s). Polynomials N (s) and D (s) are normalized (N sub n = D sub n = 1) polynomials of the even order n. The computational procedure gives explicit and straight forward instructions and formulas for obtaining the respective circuit elements. The procedure has the advantage of keeping the unavoidable computational inaccuracies to a minimum and of operating exclusively in the real domain of the respective variable. The methods of Horner, Bairstow, and Sturm and some polynomial divisions are the only tools of numerical analysis that have to be used in the computation, which can easily be performed on a desk calculating machine even if the order n of F (s) is quite high. (Author)
AD-655 778 HC$3.00 MF$0.65

RELIABILITY TEST PROGRAM OF ULTRASONIC FACE DOWN BONDING TECHNIQUE.
Sperry Rand Corp Philadelphia Pa UNIVAC Div
For primary bibliographic entry see Field 13H.
AD-655 781 HC$3.00 MF$0.65

MUTUAL COUPLING STUDY,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 9A.
AD-655 800 HC$3.00 MF$0.65

A 1600 MHZ ANTENNA FOR A TWENTY-FOUR INCH EJECTABLE SPHERE,
New Mexico State Univ University Park Physical Science Lab
For primary bibliographic entry see Field 9F.
AD-655 805 HC$3.00 MF$0.65

PERFORMANCE OF A COMBINATION PHASE AND FREQUENCY LOCK SYSTEM.
Thesis,
Naval Ordnance Lab White Oak Md
Charles F. Suter, Jr. 3 Feb 67, 39p Rept no. NOLTR-67-21

Descriptors: (* Correlators, Multiplex), Phase-locked systems, Amplitude modulation, Feedback, Control systems, Oscillators.

The report deals with the design of a synchronous demodulator for the detection of AM multiplexed signals. The demodulation scheme is unusual in that two separate feedback control loops are employed to lock the local oscillator of the demodulator in phase with the input carrier: a discrete-step coarse control loop for the purpose of handling large errors in frequency, and a conventional phase lock loop for fine control over small frequency and phase errors. A simple linear model of the phase lock loop is employed for the optimization of the phase lock loop. Transition between the coarse and fine control loops is studied in detail by means of numerical analysis of the non-linear region of operation of the phase lock loop. (Author)
AD-655 812 HC$3.00 MF$0.65

THE CONCEPT OF A TWO-DIMENSIONAL LENSLESS INCOHERENT OPTICAL CORRELATOR,
Navy Underwater Sound Lab New London Conn
For primary bibliographic entry see Field 20F.
AD-655 822 HC$3.00 MF$0.65

AERODYNAMIC BEHAVIOR OF HYPERBOLOIDAL ANTENNA STRUCTURES.
Final rept.,
Naval Academy Annapolis Md Dept of Engineering
Charles O. Heller, and William F. Peters, Jr. Jun 67, 25p Rept no. E-67-5

Descriptors: (* Antennas, Aerodynamic characteristics), Structural shells, Structures, Parabolic antennas, Aerodynamic loading, Wind, Antenna configurations.

The results of a wind-tunnel investigation of the aerodynamic behavior of hyperboloidal antenna structures are presented. Due to the increasing use of such dishes in Cassegrain antenna systems, the information should provide a useful tool for designers of antennas. The study also reveals a close correlation between the behaviors of hyperboloids and paraboloids of equal depth-to-diameter ratios, which indicates that the vast amount of available data concerning the effect of wind on parabolic shells can be used, with confidence, to design hyperbolic shells. An extensive bibliography, which includes publications in the areas of wind profiles and distributions, wind-tunnel experimentation, and the structural behavior of shallow shells, is also included. (Author)
AD-655 832 HC$3.00 MF$0.65

ANALYTICAL AND DEVELOPMENTAL INVESTIGATION OF ELECTRON STRIP MULTIPLIERS FINAL REPORT.
Stanford Research Inst., Menlo Park, Calif.
D. R. Cone. Nov 66, 37p NASA-CR-85567
Contract NAS5-9262

Descriptors: * Electron multiplier, * Performance characteristics, Characteristic, Dynode, Electron, Environment, Feedback, Function, Gain, Ion, Multiplier, Operation, Performance, Pulse, Strip, Time, Vacuum.

For abstract, see STAR 05 17.
N67-30524 HC$3.00 MF$0.65

9F. Telemetry

A HIGH ALTITUDE SENSING SYSTEM.
Special rept.,
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex.
Willis L. Webb, John W. Coffman, and George Q. Clark. Dec 59, 45p SR-28

Descriptors: (* Telemeter systems, High altitude), (* Acoustics, High altitude), Balloons, Sensors, Detectors, Amplifiers, Telemetering receivers.

Development of an acoustic sensing and telemetering system for use on constant altitude balloons is described. Evolution of the sensors, amplifiers, telemetry techniques, balloons and surface detectors are outlined and the optimum system thus far obtained is presented. Recording and processing techniques applied to the resultant data are enumerated and samples of the processed information are included. Development of the balloon platform used in this application is outlined.
AD-230 726 HC$3.00

DEVELOPMENT OF AN OCEAN DATA STATION TELEMETERING BUOY.
General Dynamics/Convair San Diego Calif
For primary bibliographic entry see Field 8C.
AD-655 618 HC$3.00 MF$0.65

A 1600 MHZ ANTENNA FOR A TWENTY-FOUR INCH EJECTABLE SPHERE,
New Mexico State Univ University Park Physical Science Lab
H. W. Haas, D. G. Henry, and B. T. Buller. Feb 67, 38p Rept no. Scientific-1
AFCRL-67-0238
Contract AF 19 (628)-5923

Descriptors: (* Telemetering antennas, * Loop antennas), Ultrahigh frequency, Spheres, Antenna radiation patterns, Standing wave ratios, Ejection, Rocket antennas, Performance (Engineering).

The PSL Model 24.006 quadraloop antenna was developed as a 1680 MHz telemetry antenna. The antenna is mounted on an ejectable twenty-four inch sphere, which is ejected from an Arcus type rocket. The antenna is designed to fit inside a nylon housing attached to the metal strut of the sphere. The Model 24.006 antenna was tested for radiation pattern, VSWR and mechanical integrity. (Author)
AD-655 805 HC$3.00 MF$0.65

FAN BEAM NAVIGATION SATELLITE STUDY. VOLUME III - ANTENNA STUDIES.
Philco Corp., Palo Alto, Calif. Wdl Div.
13 Jul 66, 203p NASA-CR-85001, WDL-TR-2962, VOL. III
Contract NASW-1368

Descriptors: * Deflection, * Navigation satellite, * Radio antenna, * Spin dynamics, * Stress analysis, Analysis, Antenna, Beam, Boom, Cantilever, Computer, Deformation, Dynamics, Effect, Electric, Honeycomb, Navigation, Pattern, Performance, Program, Radiation, Radio, Satellite, Simulation, Spin, Stress, Structural analysis.

For abstract, see STAR 05 17.
N67-31479 HC$3.00 MF$0.65

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

EXTERNAL BURNING RAMJETS PRELIMINARY FEASIBILITY STUDY.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 21E.
AD-655 459 HC$3.00 MF$0.65

EXTERNAL BURNING IN SUPERSONIC STREAMS.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 21E.
AD-655 460 HC$3.00 MF$0.65

DEVELOPMENT OF ONE AMPERE-HOUR HEAT STERILIZABLE SILVER-ZINC CELL PROGRESS REPORT, 1 JUL. - 30 SEP. 1966.
Douglas Aircraft Co., Inc., Newport Beach, Calif. Astropower Lab.
A. Himy. Oct 66, 40p NASA-CR-85785, SM-49109-Q1
Contract NAS 2-3819

Descriptors: * Environmental testing, * Silver-zinc battery, * Sterilization, Assembly, Battery, Case, Cell, Component, Composition, Design, Electric, Electrode, Environment, Gas, Heat, Mechanical, Polarization, Pressure, Seal, Separator, Silver, Terminal, Testing, Zinc.

For abstract, see STAR 05 17.
N67-31220 HC$3.00 MF$0.65

ALUMINUM BONDED LEAD TELLURIDE THERMOELECTRIC MODULE RESEARCH AND DEVELOPMENT QUARTERLY REPORT, 1 AUG. - 1 NOV. 1966.
Atomics International, Canoga Park, Calif.
1 Nov 66, 17p NASA-CR-85794, AI-66-260
Contract NAS5-10184

Descriptors: * Aluminum, * Lead telluride, * Power supply, * Thermoelectricity, Chamber, Lead, Module, Power, Resistance, Seebeck effect, Soaking, Supply, Telluride, Thermal, Vacuum.

Group 10A—Conversion techniques

For abstract, see STAR 05 17.
N67-31372 HC$3.00 MF$0.65

10B. Power Sources

ELECTRIC POWER DEVELOPMENT IN MAINLAND CHINA: PREWAR AND POSTWAR,
RAND Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 5C.
AD-123 534 HC$3.00

RESEARCH STUDIES ON THERMIONIC CONVERTERS, EMITTER SHELL PHASE.
Quarterly technical rept. no. 1, 1 Jul-30 Sep 63,
Radio Corp. of America, Lancaster, Pa.
G. Y. Eastman. Oct 63, 50p
Contract DA-36-039-AMC-03197 (E)

Descriptors: (* Ceramic materials, Structural shells), (* Thermionic converters, Structural shells), Design, Aluminum compounds, Oxides, Beryllium compounds, Carbides, Silicon compounds, Energy conversion, Permeability, Gases, Test equipment, Containers, Pyrolytic graphite, Thorium compounds, Zirconium compounds, Nitrides, Boron compounds, Borides, Titanium compounds, Silicides, Tungsten compounds, Tantalum compounds, Physical properties, Mechanical properties, Electrical properties, Silicon carbides.

As a result of the materials investigation completed to date, three types of shell materials were selected for evaluation: alumina, beryllia, and pyrolytic silicon carbide. The permeation test assembly, which is basically a 10-in. long, closed-end tube, was designed, and parts for six assemblies were ordered. Four are high alumina ceramics, ranging in purity from 98 to 99.9%; one is a beryllia body with a purity of 99.5%; and the last is a pyrolytic silicon carbide. The mass spectrometer and collection chamber methods of conducting permeation studies were reviewed and the latter was selected on the basis of its greater sensitivity. Equipment was designed, constructed, and successfully tested. Conceptual design considerations indicate that the converter may be cylindrical, and a fossil fuel burner to accomodate this shape was designed and evaluated. In burner tests with a cylindrical shape, the difference between the temperatures at the top and bottom of the test piece was 10-20 C. (Author)
AD-425 736 HC$3.00

BIOCHEMICAL FUEL CELL.
Quarterly progress rept. no. 10, 1 Oct-31 Dec 64,
Melpar, Inc., Falls Church, Va.
Gordon C. Blanchard, and Charles R. Goucher.
31 Dec 64, 54p
Contract DA-36-039-sc-90878

Descriptors: (* Fuel cells, Microorganisms), (* Microorganisms, Fuel cells), Clostridium welchii, Escherichia coli, Metabolism, Hydrogen, Culture media, Additives, Glucose, Ammonium compounds, Hydroxides, Effectiveness, Ph, Reduction, Nitrogen, Inhibition, Growth, Potatoes, Sources, Lactose, Hexoses.
Identifiers: Substrates, Sweet potatoes, Galactose.

An experimental investigation was made of some factors which regulate hydrogen production from sugars and natural products by microorganisms. Previous studies demonstrated that several natural products including sweet potatoes, Idaho potatoes, peas, beans, rice, pineapples, and oranges could serve as sources of fuel for hydrogen generation by Clostridium welchii. Most of the work in this report is concerned with hydrogen evolution from one of the better natural products, the sweet potato, as well as from sugars. The research showed that nongrowing Cl. welchii show no lag before hydrogen evolution. One should thus be able to take a dried preparation of bacteria and toss it into a natural products soup and produce hydrogen immediately. Another milestone was the finding that Escherichia coli, a common harmless organism, can be used to produce hydrogen and prepare the medium for the growth of Cl. welchii. A third finding was that hydrogen production can be continued in fermentors for long periods of time by simply periodically adding additional substrate and alkali to the reaction mixture while hydrogen is still being evolved. (Author)
AD-462 449 HC$3.00

QUESTIONS OF MAGNETOHYDRODYNAMICS III: SELECTED ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-655 362 HC$3.00 MF$0.65

VARIABLE PARAMETER POWER SOURCE.
Final rept.,
Naval Air Development Center Johnsville Pa Aero-Electronic Technology Dept
E. C. Lesoravage. 15 Jun 67, 26p Rept no. NADC-AE-6721

Descriptors: (* Power supplies, Laboratory equipment), Design, Modulation.

A variable parameter power source was designed and fabricated to provide a 30-kva 3-phase source of power with controllable voltage modulation, frequency modulation and harmonic content for the purpose of simulating these power characteristics as described in MIL-STD-704. (Author)
AD-655 440 HC$3.00 MF$0.65

TRANSIENT ELECTRICAL VOLTAGES IN MILITARY TRACKED VEHICLES.
Research and development technical rept.,
Army Electronics Command Fort Monmouth N J
Bernard Reich. Apr 67, 21p Rept no. ECOM-2827

Descriptors: (* Motor generators, Transients), (* Tracked vehicles, Motor generators), Generators, Rectifiers, Power supplies, Electrical equipment, Voltage, Electrical impedance.
Identifiers: Alternators.

The report presents data on the characteristics of the 100-ampere alternator and 400-ampere d-c generator systems found in most tracked vehicles currently used. The characteristics presented are based on the overall generating and control system including the generator, regulator and rectifiers where applicable. The details of measurement and resultant parameters are presented. The report also includes the most common causes of electrical transients and representative magnitudes. It would appear from this analysis that the 100-ampere system yields transients of much greater time duration than noted for the 400-ampere system. (Author)
AD-655 533 HC$3.00 MF$0.65

A METHOD FOR PREDICTING SOLAR CELL CURRENT- VOLTAGE CURVE CHARACTERISTICS AS A FUNCTION OF INCIDENT SOLAR INTENSITY AND CELL TEMPERATURE.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
J. D. Sandstrom. 15 Jul 67, 12p NASA-CR-85704, JPL-TR-32-1142
Contract NAS7-100

Descriptors: * Computer program, * Linear equation, * Silicon, * Solar cell, Cell, Characteristics, Computer, Current, Curve, Equation, Function, Intensity, Linear, Performance, Prediction, Program, Solar, Temperature, Voltage.

For abstract, see STAR 05 17.
N67-30868 HC$3.00 MF$0.65

SOLAR CELL COVER GLASS DEVELOPMENT QUARTERLY TECHNICAL PROGRESS REPORT, 15 JUN. - 1 SEP. 1966.
Ion Physics Corp., Burlington, Mass.
1 Sep 66, 33p NASA-CR-85599, QTPR-1
Contract NAS5-10236

Descriptors: * Cover, * Silicon oxide, * Solar cell, Beam, Cell, Coating, Effect, Electron, Evaporation, Glass, Irradiation, Oxide, Proton, Reflection, Silicon, Solar, Sputtering, Temperature, Vacuum.

For abstract, see STAR 05 17.
N67-30935 HC$3.00 MF$0.65

COMBINED DESALINATION AND POWER GENERATION USING COAL ENERGY. PHASE II. INVESTIGATION OF EMERGING TECHNOLOGY, BY-PRODUCT RECOVERY, AND VERY LARGE CAPACITIES.
Kellogg (M. W.) Co., Piscataway, N. J. Research and Development Center.
For primary bibliographic entry see Field 7A.
PB-174 938 HC$3.00 MF$0.65

10C. Energy Storage

VOLTAMMETRIC STUDIES OF NON-AQUEOUS SYSTEMS.
Semi-annual rept. no. 1, 1 Jul-31 Dec 66,
TRW Systems Redondo Beach Calif
O. Paez, E. T. Seo, and H. P. Silverman. Apr 67, 99p
ECOM-02464-1
Contract DA-28-043-AMC-02464 (E)

Descriptors: (* Batteries + components, Organic materials), (* Electrolytes, Organic materials), (* Cathodes (Electrolytic cell), Organic materials), (* Organic nitrogen compounds, Electrochemistry), Organic solvents, Reduction (Chemistry), Nitrobenzenes, Carbonates, Anodes (Electrolytic cell), Lithium, Oxidizers, Nitrophenols, Toluenes, Chlorine compounds, Alcohols, Alkanes.
Identifiers: Organic batteries, Chloro dinitrobenzenes, Dinitro benzenes, Dinitro phenols, Dinitro toluenes.

Voltammetric studies of the reduction of organic compounds in organic solvents were undertaken as part of a program to develop high-energy density organic electrolyte batteries. Cyclic voltammetry was used as a major diagnostic tool for evaluating organic oxidizing agents as possible high-energy density cathode materials, and to elucidate the mechanisms of a heterogeneous electron transfer and any homogeneous follow-up chemical reactions. The report covers the study of various nitroaromatic compounds, cyclic voltammetric current-potential curves and their interpretation are presented for a number of selected nitroaromatic compounds. The effects of methyl-, halo-, and hydroxy-groups on the electroreduction process were demonstrated. Compounds studied included m- and p-dinitrobenzene, 2,5-dinitrophenol, m-dinitrotoluene, 1-chloro-2,6-dinitrobenzene and nitroalkanes. The addition of lithium ions was shown to have a beneficial effect on organic reductions under selected conditions. (Author)
AD-655 271 HC$3.00 MF$0.65

LONG LIFE STABLE ZINC ELECTRODES FOR ALKALINE SECONDARY BATTERY.
Quarterly technical progress rept. no. 1, 1 Dec 66-28 Feb 67,
Yardney Electric Corp New York
Jerome Goodkin. 31 Mar 67, 40p
ECOM-0185-1
Contract DAAB07-67-C-0185

Descriptors: (* Storage batteries, Electrodes), (* Alkaline cells, Electrodes), (* Electrodes, * Zinc), Silver, Binders, Halocarbon plastics, Performance

(Engineering), Electrical properties, Sintering, Battery separators, Platinum, Carbon, Electrochemistry.
Identifiers: Silver-zinc cells.

A program for the development of a stable long-life zinc electrode was initiated. A cell parameter study was undertaken to investigate the relationship between binder, electrode area ratio, silver to zinc ratio, and electrode height-to-width ratio. A statistical design was developed and cells constructed based on this design. Techniques of preparing wet-proofed zinc oxide were studied. Two basic methods were evaluated and a successful batch technique was developed. Studies on methods of using the zinc electrode in a sealed cell system were initiated. The study was limited to an evaluation of third electrodes in silver-zinc oxide cells. Three types of platinum and carbon third electrodes are being studied. The data, to date, indicate that difficulties will be encountered when platinum electrodes are used.
AD-655 285 HC$3.00 MF$0.65

SYNTHETIC SILVER OXIDE IN THE PREPARATION OF BATTERY ELECTRODES,
Defence Chemical Biological and Radiation Labs Ottawa (Ontario)
J. R. Coleman, and T. E. King. 1966, 14p Rept no. DCBRL-506
Availability: Published in Power Sources p193-205 1966.

Descriptors: (*Batteries + components, Electrodes), (*Electrodes, *Silver compounds), Oxides, Synthesis (Chemistry), Purification, Material forming, Binders, Additives, Carbon, Electrical properties, Performance (Engineering), Canada.
Identifiers: Depolarizers (Electrical), Silver oxides.

Chemically prepared silver oxide (AgO) is used as the depolarizer in electrodes designed for a high-rate primary application. The AgO, blended with a few per cent of carbon, is compressed into a plaque on a silver grid, using methyl cellulose as binder. Coulombic efficiencies in the range 75-80 per cent of theoretical are attained on discharge at about 1.1 amp/sq. in. Variations in preparation designed to increase efficiency are described, as are some characteristics of the resulting plates. The added carbon is thought to act by maintaining electrical contact within the plate during discharge. (Author)
AD-655 312 Not available from CFSTI.

THE THERMAL REACTION BATTERY ELECTROLYTES FROM THE PYROLYSIS OF OXIME DERIVATIVES,
Harry Diamond Labs Washington D C
Fred M. Dewey. Jun 67, 29p Rept no. HDL-TR-1351

Descriptors: (*Thermal batteries, Electrolytes), (*Electrolytes, Oximes), (*Oximes, Pyrolysis), Organic solvents, Esters, Ethers, Decomposition, Reaction kinetics, Electrical conductance, Catalysis, Synthesis (Chemistry).
Identifiers: Aldoximes.

Organic compounds that can be thermally degraded to yield permanently liquid solvents for ionizable salts are being sought for use in electrolytes for the proposed thermal reaction battery. Several oximes, oxime esters, and oxime ethers were prepared and pyrolyzed. Some of the pyrolyses were rapid at temperatures near 200C, most success being attained with aldoxime esters. Evidence thus far indicates that an acceptable pyrolysis rate can be obtained at these or lower temperatures using Lewis-acid catalysts or at higher temperatures using high-boiling materials. Prior conductivity measurements have indicated that solutions of inorganic salts in the pyrolysis products of oxime esters will give specific conductances sufficient for the proposed thermal reaction battery. (Author)
AD-655 843 HC$3.00 MF$0.65

MATERIALS FOR ELECTROCHEMICAL CELL SEPARATORS SUMMARY REPORT.
TRW Equipment Labs., Cleveland, Ohio. Materials Technology.
J. W. Vogt. 3 Jul 67, 44p NASA CR-72267, SR-2
Contract NAS3-8522

Descriptors: *Asbestos, *Electrochemical cell, *Material testing, Absorption, Cell, Density, Electrochemical, Fiber, Gas, Liquid, Material, Permeability, Pore, Separator, Size, Strength, Structure, Testing, Thickness.

For abstract, see STAR 05 17.
N67-30685 HC$3.00 MF$0.65

DEVELOPMENT OF ONE AMPERE-HOUR HEAT STERILIZABLE SILVER-ZINC CELL PROGRESS REPORT, 1 OCT. - 31 DEC. 1966.
Douglas Aircraft Co., Inc., Newport Beach, Calif. Astropower Lab.
A. Himy. Jan 67, 40p NASA-CR-85564, SM-49109-Q2
Contract NAS2-3819

Descriptors: *Separator, *Silver-zinc battery, *Sterilization, Battery, Configuration, Electric, Flight, Heat, Hydrogen, Inorganic, Mechanical, Orbital, Pressure, Reliability, Seal, Silver, Wafer, Zinc.

For abstract, see STAR 05 17.
N67-30802 HC$3.00 MF$0.65

SEPARATOR DEVELOPMENT FOR A HEAT STERILIZABLE BATTERY FINAL SUMMARY PROGRESS REPORT, 1 MAY 1966 - 15 MAR. 1967.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Monsanto Research Corp., Everett, Mass. Boston Lab.
M. Lehman, E. A. Mc Elhill, J. J. Oconnell, and R. C. Steeves. 15 Mar 67, 64p NASA-CR-84862, MRB6234F
Contracts NAS7-100, JPL-951524
Prepared for Jpl

Descriptors: *Polymer chemistry, *Separator, *Silver-zinc battery, *Vinyl polymer, Absorption, Battery, Chemistry, Durability, Electric, Film, Flexibility, Hydrolysis, Ligand, Material, Polymer, Polystyrene, Resistivity, Silver, Stability, Sterilization, Strength, Tensile, Test, Vinyl, Zinc.

For abstract, see STAR 05 17.
N67-30918 HC$3.00 MF$0.65

DEVELOPMENT AND FABRICATION OF ADVANCED BATTERY ENERGY STORAGE SYSTEM MID-TERM REPORT, 27 SEP. 1966 - 26 MAR. 1967.
Boeing Co., Seattle, Wash. Space Div.
S. Gross, and H. Oman. 10 Apr 67, 66p NASA-CR-85786
Contract NAS9-6470

Descriptors: *Energy storage device, *Silver-cadmium battery, *Spacecraft power supply, Analysis, Battery, Cadmium, Calorimeter, Cell, Charge, Controller, Design, Device, Discharge, Energy, Manned, Orbital, Packaging, Power, Secondary, Silver, Spacecraft, Storage, Supply, Thermal, Vent.

For abstract, see STAR 05 17.
N67-31411 HC$3.00 MF$0.65

11. MATERIALS

11A. Adhesives and Seals

DEVELOPMENT OF MAIN-SHAFT SEALS FOR ADVANCED AIR-BREATHING PROPULSION SYSTEMS SEMIANNUAL REPORT, 1 JUL. - 31 DEC. 1966.
Pratt and Whitney Aircraft, East Hartford, Conn.
A. J. Parks, R. M. Slayton, and R. L. Thomas. 20 Jan 67, 85p NASA-CR-85908, PWA-2996
Contract NAS3-7609

Descriptors: *Air breathing engine, *Sealing, *Thermal property, Air, Breathing, Carbon, Contact, Deflection, Engine, Field, Gas, Heat transfer, Hydrostatic, Leakage, Main, Orifice, Piston, Pressure, Property, Propulsion, Ring, Shaft, Thermal, Turbine.

For abstract, see STAR 05 17.
N67-31128 HC$3.00 MF$0.65

THEORETICAL AND EXPERIMENTAL STUDIES OF VISCO TYPE AND BUFFERED SHAFT SEALS SEMIANNUAL PROGRESS REPORT, 15 OCT. 1966 - 15 APR. 1967.
Tennessee Univ., Knoxville. Dept. of Mechanical and Aerospace Engineering.
C. F. Fisher, Jr., and W. K. Stair. May 67, 25p NASA-CR-85893, ME-67-587-9
Grant NSG-587

Descriptors: *Fuel system, *Performance prediction, *Sealing, *Shaft, *Spacecraft design, Buffer, Design, Dimensional, Dynamics, Effect, Flow, Fuel, Gas, Geometry, Groove, Interface, Laminar, Liquid, Mixing, Performance, Prediction, Spacecraft, Surface, System, Test, Three, Turbulent, Viscous.

For abstract, see STAR 05 17.
N67-31390 HC$3.00 MF$0.65

11B. Ceramics, Refractories, and Glasses

RESEARCH STUDIES ON THERMIONIC CONVERTERS, EMITTER SHELL PHASE.
Radio Corp. of America, Lancaster, Pa.
For primary bibliographic entry see Field 10B.
AD-425 736 HC$3.00

STUDY OF VIBRATION OF CONCRETE. REPORT 1. REVIEW OF LITERATURE.
Technical rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
H. Sugiuchi. Jun 67, 36p Rept no. TR-6-780
Availability: Hard copy available from Army Engineer Waterways Experiment Station, Vicksburg, Miss., $0.75.

Descriptors: (*Concrete, Vibration), Attenuation, Vibrators (Mechanical), Mechanical impedance.

The review was conducted to summarize and critically evaluate previous work dealing with or relevant to internal vibration of fresh concrete, and to determine approaches for further studies concerning vibration of concrete. It has been found that the previous studies, with some exceptions, have not approached the subject from a consistent viewpoint of internal vibration as a vibratory process, i.e. all of the many and complex parameters were not tied together to relate to the process of mechanical vibration. The primary difficulty lies in trying to observe the process in a too complex condition. The recommendation of this review is that the mechanics of internal vibrators be determined and related to the behavior of fresh concrete under

vibration so that the influence of each parameter may be more clearly defined. (Author)
AD-655 261 MF$0.65

INVESTIGATION OF THE VARIABLES CONTROLLING THE FLUX GROWTH OF HIGH QUALITY LASER CRYSTALS.
American Science and Engineering Inc Cambridge Mass
For primary bibliographic entry see Field 20B.
AD-655 388 HC$3.00 MF$0.65

REBINDER EFFECTS IN MgO.
Martin Co Baltimore Md Research Inst for Advanced Studies
For primary bibliographic entry see Field 20B.
AD-655 455 HC$3.00 MF$0.65

INVESTIGATION OF CONCRETE IN EISENHOWER AND SNELL LOCKS ST. LAWRENCE SEAWAY.
Technical rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
A. D. Buck, B. Mather, and H. T. Thornton, Jr.
Jul 67, 234p Rept no. TR-6-784
Sponsored by Office, Chief of Engineers, U. S. Army, and Army Engineer District, Buffalo.
Availability: Hard copy available from Army Engineer Waterways Experiment Station, Vicksburg, Miss., $3.75.

Descriptors: (*Concrete, Degradation), Inland waterways, Structures, Underground structures, Aging (Materials), Failure (Mechanics).
Identifiers: St. Lawrence Seaway.

It is concluded that the deterioration of the concrete that has manifested damage in certain parts of the Eisenhower Lock is the result of the exposure conditions to which it was subjected at a time when it had not attained sufficient maturity to resist these conditions. The exposure conditions are more severe than those to which any previous mass concrete structure is known to have been exposed. The severity results from the combination of three factors: (a) the production in the concrete of an extreme, critical degree of saturation by water due to submergence of the affected portions of the structure during normal navigation operations, (b) the exposure of such critically saturated concrete to very severe freezing conditions after termination of navigation in the early winter, and (c) the prolonged exposure of the concrete to these severe conditions that allowed freezing to progress to a depth of several feet behind exposed surfaces. The lack of adequate maturity of the affected concrete to resist these exposure conditions resulted from the use as the cementitious material in it of a blend of portland and natural cements that matures more slowly than a comparable cementitious material consisting solely of portland cement. (Author)
AD-655 504 MF$0.65

AN INVESTIGATION FOR FABRICATING AND EVALUATING THE PROPERTIES OF CHEMICALLY VAPOR DEPOSITED ALUMINA AND MAGNESIA.
Interim rept. Mar 66-Mar 67,
Raytheon Co Waltham Mass Research Div
Ray C. Ellis. Apr 67, 73p Rept no. S-946
AMRA-CR-67-08
Contract DA-19-066-AMC-318 (X)

Descriptors: (*Alumina, *Vapor plating), (*Ceramic coatings, Deposition), Aluminum compounds, Chlorides, Hydrolysis, Thermodynamics, Crystal structure, Microstructure, Density, Optical properties, Flexural strength, Thermal expansion, Substrates.

The chemical vapor deposition technique for aluminum oxide was investigated using the reaction 2AlCl3 + 3H2O yields Al2O3 + 6HCl. Transparent, theoretically dense, alpha-aluminum oxide was produced. If the pressure or deposition rate was increased, the product became white and opaque due to the inclusion of many small voids. If the deposition temperature was decreased or the partial pressure of water in the reaction increased, there was a tendency to co-deposit the theta modification. Both isotropic and anisotropic aluminum oxide could be produced, depending on process conditions. Two problems which presently limit the thickness of the transparent material are the rather narrow range of suitable reaction conditions and the nozzle design, which allows a product buildup on the gas inlet tube. (Author)
AD-655 585 HC$3.00 MF$0.65

THERMAL DIFFUSIVITY OF CARBONS AND GRAPHITES IN THE TEMPERATURE RANGE FROM 1800 to 3300K.
Aerospace Corp El Segundo Calif Labs Div
J. Kaspar, and E. H. Zehms. Jun 67, 33p Rept no. TR-1001 (9250-02)-2
SSP-TR-67-116
Contract AF 04 (695)-1001

Descriptors: (*Carbon, *Thermal diffusion), (*Pyrolytic graphite, Thermal diffusion), Test methods, Graphite, Thermal properties, Temperature, Thermal conductivity, Transport properties, Band theory of solids, Brillouin zones.

Improved and new steady periodic heat flow methods for the direct measurement of the thermal diffusivity of carbons and graphites at very high temperatures were developed. Their main features are techniques that overcome the difficulties arising from the radiative environment with thermal conductance much greater than that of the material under investigation. The thermal diffusivities of various carbons and graphites were determined with these techniques and were found to be essentially independent of temperature throughout the entire range investigated. It is argued that the observed c-direction conduction in pyrolytic graphite is probably not of intrinsic nature, but is at best a small component of the a-direction conduction caused by tilt angle variations of the microcrystallites. It is further suggested that the heat conduction in graphites at high temperatures is substantially of electronic nature, a point supported by Lorenz numbers based on more recent data. The essentially temperature-independent diffusivity of graphite reflects, then, the behavior of ordinary metals above the Debye temperatures. (Author)
AD-655 786 HC$3.00 MF$0.65

DYNAMIC SHEAR RESISTANCE OF THIN-WEBBED REINFORCED CONCRETE BEAMS.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13M.
AD-655 823 HC$3.00 MF$0.65

NUCLEAR SCIENCE AND TECHNOLOGY FOR CERAMISTS.
National Bureau of Standards, Washington, D.C.
26 May 67, 75p
Proceedings of the American Ceramic Society Symposium, Washington, D. C., 7-12 Apr 1966. Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $1.75.

Descriptors: (*Ceramic materials, *Nuclear engineering), (*Reactor materials, Ceramic materials), Radiation damage, Solid state physics, Reactor fuels, Reactor moderators, Crystal lattice defects, Annealing, Color centers, Phase studies, Uranium compounds, Dioxides, Reactor operation, Symposia.

A collection of papers is presented which has the purpose of providing an introductory survey of properties involved in the choice and use of ceramic materials in nuclear technology. Topics include: Radiation fields present in nuclear reactors and the features of these fields most important to the development of nuclear materials; Principle physical effects induced in materials by reactor radiation; Solid state effects of radiation damage processes, with examples drawn partially from ceramics; Physical properties of irradiated ceramic materials; Thermodynamics of nonstoichiometry and its applications to nuclear fuels; Problems encountered in the development of nuclear fuels, reactor moderators, and structural materials.
NBS-Misc-Pub-285 HC$1.75 MF$0.65

RESEARCH ON THE MECHANISM AND KINETICS OF OXIDATION OF SILICON IN AIR SEMIANNUAL REPORT, 1 DEC. 1966 - 31 MAY 1967.
Pennsylvania State Univ., University Park. Materials Research Lab.
F. Lukes, R. Rai, and K. Vedam. 10 Jun 67, 42p
NASA-CR-85801, SAR-4
Contract NGR-39-009-042

Descriptors: *Film thickness, *Oxide film, *Refractive index, *Silicon, *Spectrometry, Ellipsometer, Film, Index, Instrumentation, Kinetics, Measurement, Mechanism, Oxidation, Oxide, Refraction, Thickness, Thin.

For abstract, see STAR 05 17.
N67-31050 HC$3.00 MF$0.65

MULTIDISCIPLINARY RESEARCH ACTIVITY IN THE MATERIALS SCIENCES WITH EMPHASIS ON CERAMIC MATERIALS SEMIANNUAL STATUS REPORT, 16 DEC. 1966 - 15 JUN. 1967.
Washington Univ., Seattle. Ceramic Engineering Div.
J. I. Mueller. 15 Jun 67, 35p NASA-CR-85768, SASR-8
Grant NSG-484

Descriptors: *Ceramics, *Materials science, *Surface chemistry, Calorimetry, Chemistry, Diffusion, Distribution, Electron, Energy, Material, Oxygen, Phase, Processing, Property, Relaxation, Science, Solid, State, Surface, Thermodynamics, Time, Zirconium.

For abstract, see STAR 05 17.
N67-31333 HC$3.00 MF$0.65

HAND-MADE BLOWN GLASS AND FINE CAST CRYSTAL.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
For primary bibliographic entry see Field 5C.
PB-175 549 HC$3.00 MF$0.65

11C. Coating, Colorants, and Finishes

AN INVESTIGATION FOR FABRICATING AND EVALUATING THE PROPERTIES OF CHEMICALLY VAPOR DEPOSITED ALUMINA AND MAGNESIA.
Raytheon Co Waltham Mass Research Div
For primary bibliographic entry see Field 11B.
AD-655 585 HC$3.00 MF$0.65

DESIGN AND FABRICATION OF RADOME EROSION PROTECTION SHOES FOR F-4, A-7A AND F-111B.
Goodrich (B.F.) Aerospace and Defense Products, Akron, Ohio.
For primary bibliographic entry see Field 17I.
AD-814 727 HC$3.00 MF$0.65

SUMMARY OF INVESTIGATIONS OF LIGHT SCATTERING IN HIGHLY REFLECTING PIGMENTED COATINGS.
IIT Research Inst., Chicago, Ill.

B. H. Kaye, and G. A. Zerlaut. Jul 67, 114p
NASA-CR-844
Contract NASR-65/07/

Descriptors: *Light scattering, *Optical reflectivity, *Pigment, *Silver bromide, Bromide, Coating, Dispersion, Distribution, Film, High, Light, Liquid, Model, Monte carlo method, Optical, Paint, Particle, Property, Reflection, Scattering, Silver, Size, Solid, Suspension, Thickness.

For abstract, see STAR 05 17.
N67-30866 HC$3.00 MF$0.65

FUNDAMENTALS OF ELECTROPLATING, PART II.
Israel Program for Scientific Translations, Ltd., Jerusalem.
For primary bibliographic entry see Field 13H.
For abstract, see STAR 05 17.
N67-30933 HC$3.00 MF$0.65

DEVELOPMENT OF PROTECTIVE COATINGS FOR CHROMIUM-BASE ALLOYS SEMIANNUAL PROGRESS REPORT.
Battelle Memorial Inst., Columbus, Ohio.
E. S. Bartlett, J. J. English, C. A. Mac Millan, and D. N. Williams. 20 Jul 66, 47p NASA-CR-85869, SAPR-2
Contract NAS3-7612

Descriptors: *Chromium alloy, *Nickel alloy, *Protective coating, *Turbine blade, *Vane, Alloy, Aluminum, Barrier, Blade, Bonding, Chromium, Cladding, Coating, Diffusion, Ductility, Feasibility, High temperature, Nickel, Oxidation, Protection, Resistance, Testing, Tungsten, Turbine.

For abstract, see STAR 05 17.
N67-31162 HC$3.00 MF$0.65

HALL AND PHOTORESPONSE MEASUREMENTS ASSOCIATED WITH ULTRAVIOLET AND NEAR ULTRAVIOLET DEGRADATION OF THIN ZINC OXIDE FILMS.
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 17.
N67-31329 HC$3.00 MF$0.65

PROTECTIVE COATINGS FOR CHROMIUM ALLOYS SEMIANNUAL REPORT, 1 MAY - 1 NOV. 1966.
Chromalloy Corp., West Nyack, N. Y.
A. Block, and M. Negrin. 1 Nov 66, 74p NASA-CR-85911, SAR-2
Contract NAS3-7273

Descriptors: *Aluminum, *Chromium alloy, *Protective coating, Alloy, Bending, Change, Chromium, Coating, Cobalt, Compound, Cyclic, Deposition, Erosion, Gas, Iron, Nitrogen, Oxidation, Protection, Resistance, Testing, Titanium, Transition, Tungsten, Weight, Yttrium.

For abstract, see STAR 05 17.
N67-31414 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A PLANT FOR PLATING OF AUTOMOBILE PARTS.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 547 HC$3.00 MF$0.65

MICROSCOPIC OBSERVATIONS OF ULTRAVIOLET IRRADIATED AND WEATHERED SOFT WOOD SURFACES AND CLEAR COATINGS.
Forest Products Lab., Madison, Wis.
For primary bibliographic entry see Field 11L.
PB-175 557 HC$3.00 MF$0.65

11D. Composite Materials

RESEARCH ON WHISKER-REINFORCED METAL COMPOSITES.
Final rept. Apr 66-Apr 67,
Melpar Inc Falls Church Va Materials Lab
P. J. Lare, A. P. Divecha, and H. Hahn. May 67, 91p Rept no. 6142.00100
Contract NOw-66-0213

Descriptors: (*Composite materials, Preparation), (*Aluminum alloys, Composite materials), (*Sapphires, Composite materials), (*Reinforcing materials, *Whiskers (Crystals)), Hot pressing, Metal coatings, Tungsten, Nickel, Chromium, Vapor plating, Degradation, Mechanical working, Hot working, Silicon.
Identifiers: Metal-matrix composites.

Several aluminum-alloy-sapphire-whisker composite systems were investigated. Consolidation by liquid-phase hot pressing developed previously was significantly improved to yield dense composites with aluminum-silicon hypoeutectic matrices. Strengths in excess of 49,000 psi were obtained in biaxially oriented, unworked composites with 20 to 25 v/o (1-3 micron) whiskers. In general, the percent increase in composite strengths was greater at elevated temperatures than at room temperature. Magnetic alignment of nickel-coated (1-30 micron) whiskers resulted in increasing the uniformity of composite properties. Mechanical working of biaxially oriented aluminum-silicon composites was examined. Hot rolling was the only technique found suitable. Reinforcement in worked composites was erratic owing to severe whisker segregation. Sequential deposition of nickel and chromium by vapor plating was developed and optimized. Fabrication of nichrome composites by densification of the coated whisker mats appeared to be promising. However, initial attempts were hampered by incompatibility of available die materials. (Author)
AD-655 311 HC$3.00 MF$0.65

INVESTIGATION OF BONDING IN OXIDE-FIBER (WHISKER) REINFORCED METALS.
Interim rept. 18 Apr 66-18 Apr 67,
General Electric Co Philadelphia Pa Missile and Space Div
W. Edwin Sauer, Willard H. Sutton, and Earl Feingold. 15 May 67, 40p
AMRA-CR-66-01/4
Contract DA-19-066-AMC-330 (X)

Descriptors: (*Composite materials, Bonding), (*Nickel, Composite materials), (*Sapphires, Composite materials), (*Reinforcing materials, *Whiskers (Crystals)), Nickel alloys, Alumina, Additives, Chromium alloys, Titanium alloys, Zirconium alloys, Cerium alloys, Yttrium compounds, Vanadium alloys, Drop testing, Electron microscopy, Microanalysis, Surfaces.
Identifiers: Metal-matrix composites.

The work was part of a continuing effort to determine the effects which various additives have on the wetting and bonding of nickel and nickel alloys to single crystal sapphire. The effects of dilute alloys (0.002 to 0.088 atomic percent (a/o) Cr, Ti, and Zr were studied by sessile drop experiments, and the specimens characterized by electron microscopy and by electron probe microanalysis. A number of parameters which influence the wetting and the bonding were identified. In addition, some studies were made of the wetting of sapphire by 1 a/o alloys of Ce/Ni, Y/Ni, V/Ni.
AD-655 583 HC$3.00 MF$0.65

INVESTIGATION OF THE PHYSICAL-CHEMICAL NATURE OF THE MATRIX-REINFORCEMENT INTERFACE.
Technical rept. 1 Jun 65-1 Jun 66,
Dow Chemical Co Midland Mich
O. Johannson, F. Stark, and G. Vogel. Dec 66, 130p
AFML-TR-65-303-Pt-2
Contract AF 33 (615)-1667
See also AD-629 777.

Descriptors: (*Reinforced plastics, Interfaces), Bonding, Binders, Silanes, Acrylic resins, Reinforcing materials, Glass textiles, Tracer studies, Electron microscopy, Calorimetry, Chemical bonds, Polymerization, Epoxy plastics, Adsorption.

This study of the nature of the interfaces in reinforced plastics provided physical chemical evidence which supports postulated covalent bonding mechanisms at glass-coupling agent-resin interfaces. These conclusions were derived from studies of the interactions of monofunctional silanes and silane coupling agents with E-glass, aerosil, and polymethylmethacrylate surfaces. Experimental methods employed were radiochemical tracer techniques, electron microscopy, and calorimetric heats of immersion. (Author)
AD-655 736 HC$3.00 MF$0.65

STUDY OF BONDING BETWEEN GLASS AND PLASTIC IN GLASS-REINFORCED PLASTICS - EXTENDED WORK QUARTERLY PROGRESS REPORT, 1 JAN. - 31 MAR. 1967.
Stanford Research Inst., Menlo Park, Calif.
M. D. Bertolucci, D. L. Chamberlin, Jr., and M. V. Christensen. 9 May 67, 11p NASA-CR-84865, QPR-10
Contract NASR-49/14/

Descriptors: *Alkylation, *Fluorination, *Glass fiber, Fiber, Glass, Infrared, Laminate, Lattice, Modification, Oxygen, Production, Silicon, Surface.

For abstract, see STAR 05 17.
N67-30810 HC$3.00 MF$0.65

11E. Fibers and Textiles

HIGH-SPEED ABRASION OF TEXTILE CORDAGE ON AN ASPHALT SURFACE.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
J. E. Swallow, and M. W. Webb. Jan 67, 22p Rept no. RAE-TR-67023

Descriptors: (*Textiles, Cordage), (*Cordage, Wear resistance), Runways, Asphalt, Test methods, Tires, Aircraft tires, Reinforcing materials, Pavements, Nylon, Tensile properties, Polyester plastics, Polyethylene plastics, Fibers (Synthetic), Surfaces, Velocity, Great Britain.
Identifiers: Abrasion.

Braided cordages of nylon, polyester and polypropylene fibers were abraded at high speed on an asphalt surface. Two complementary methods of testing were shown to be suitable for comparing different textiles, textile treatments and abrading surfaces. In one series of tests, the velocity, tension and time of abrasion were varied factorially, and the residual breaking strengths of the cordages were compared with results obtained with a concrete surface. In a second series, the effects of velocity and tension on failure-time were determined; experimental simplification was achieved, and no limit imposed on the severity of the conditions. (Author)
AD-655 484 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A WOOL SCOURING PLANT.
Agency for International Development, Washington, D. C. Communications Resources Div.

For primary bibliographic entry see Field 5C.
PB-175 543 HC$3.00 MF$0.65

11F. Metallurgy and Metallography

FERROMAGNETIC RESONANCE OF He3-IR-RADIATED THIN METAL FILMS,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 20L.
AD-655 234 HC$3.00 MF$0.65

SOLIDIFICATION AND SEGREGATION IN WELDING OF BINARY ALLOYS.
Army Materials Research Agency Watertown Mass
For primary bibliographic entry see Field 13H.
AD-655 262 HC$3.00 MF$0.65

MICROBIAL-METAL CORROSION - LITERATURE REPORT.
Army Weapons Command Rock Island Ill Research and Engineering Div
For primary bibliographic entry see Field 6M.
AD-655 274 HC$3.00 MF$0.65

THE RESISTANCE OF GREASE LUBRICATED METAL COMBINATIONS TO FRETTING DAMAGE.
Final technical rept.,
Army Weapons Command Rock Island Ill Research and Engineering Div
S. Fred Calhoun. Jun 67, 16p
RIA-67-1594

Descriptors: (*Wear resistance, Metals), (*Aluminum, Wear resistance), (*Bronze, Wear resistance), (*Steel, Wear resistance), (*Stainless steel, Wear resistance), (*Titanium, Wear resistance), Greases, Lubrication, Pressure, Vibration, Hardness.
Identifiers: Frettage.

Five different metals were oscillated against each other to assess the extent of fretting damage. They were all lubricated with the same grease and were subjected to the same pressures and vibration rates. The extent of the fretting damage was dependent upon the softness of the metals and also upon the nature of the metals in contact. Metal specimens oscillated against a like metal suffered less damage than when different metals were in contact. (Author)
AD-655 276 HC$3.00 MF$0.65

INVESTIGATION OF THE EFFECT OF SURFACE CONDITIONS ON THE RADIANT PROPERTIES OF METALS. PART II. MEASUREMENTS ON ROUGHENED PLATINUM AND OXIDIZED STAINLESS STEEL.
Technical rept. 1 Jan 65-15 Sep 66
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
R. E. Rolling, and A. I. Funai. Apr 67, 264p Rept no. LMSC-6-77-67-27
AFML-TR-64-363-Pt-2
Contract AF 33 (657)-11281

Descriptors: (*Platinum, Thermal radiation), (*Stainless steel, Thermal radiation), Surface properties, Roughness, Oxidation, Metals, Emissivity, Films.
Identifiers: Stainless steel 304.

Experimental results are presented to show the effect of surface roughness and of surface oxidation on the radiant properties of platinum and of 304 stainless steel. The radiant properties investigated include total and spectral normal, hemispherical, and directional emittance as a function of emission angle, polarization, temperature, and surface roughness or oxide film thickness. Emittance data are presented for five platinum samples with surface roughness values between 0.20 and 2.50 microns, rms, at five temperatures between 865 and 1645 K, and at selected wavelengths between 1 and 12 microns. Similar data are presented for nine stainless steel samples with surface oxide film-thickness values between 0 and 1.5 microns, at five temperatures between 535 and 1090 K. Variations in the radiant properties of each material are explained in terms of the differences in surface characteristics of the samples, or of changes in their surface characteristics as the result of annealing, recrystallization, and oxidation during the high temperature emittance tests. Methods used to evaluate the physical, chemical, and geometrical characteristics of the sample surface include: profilometry, optical and electron microscopy, x-ray and electron diffraction, and arc spectroscopy. The advantage and shortcomings of these methods are discussed and typical results are presented. (Author)
AD-655 384 HC$3.00 MF$0.65

THE EFFECT OF ORIENTATION AND IMPURITIES ON THE MECHANICAL PROPERTIES OF MOLYBDENUM SINGLE CRYSTALS.
General Electric Research Lab Schenectady N Y
D. F. Stein. 1967, 18p Rept no. Reprint-5648
AROD-4074:3
Contract DA-31-124-ARO (D)-95
Availability: Published in Canadian Journal of Physics v45 p1063-74 1967.

Descriptors: (*Single crystals, Molybdenum), (*Molybdenum, Mechanical properties), Zone melting, Shear stresses, Ductility, Low-temperature research, Fracture (Mechanics), Purification, Tests.

Molybdenum single crystals containing less than 10 p.p.m. of carbon, 5 p.p.m. of nitrogen, and 5 p.p.m. of oxygen have been prepared by zone melting and hydrogen gas purification. The mechanical properties of the crystals have been measured in tension and compression over a range of temperature from 20 to 298 K. It was found that the critical resolved shear stress and the temperature dependence of the critical resolved shear stress decreased with increasing purity. It was found that at all test temperatures the CRSS law fails. The critical resolved shear stress is a minimum in the (100) tension axis orientation and reaches a maximum with the tensile axis along the (110) (111) line of the stereographic triangle. It was also found that the ductility of molybdenum single crystals was not improved by purification. (Author)
AD-655 412 Not available from CFSTI.

AN INVESTIGATION OF THE THERMODYNAMIC PROPERTIES OF SOME LIQUID TIN ALLOYS.
Final technical rept.,
Denver Research Inst Colo
M. J. Pool, and J. R. Guadagno. Jul 67, 23p Rept no. DRI-2411
AROD-5246:1-MC
Contract DA-31-124-ARO (D)-384

Descriptors: (*Tin alloys, Thermodynamics), Liquid metals, Heat of formation, Palladium alloys, Heat of solution, Tellurium alloys, Rhodium alloys, Calcium alloys, Strontium, Barium alloys, Lanthanum.

The heats of solution of various elements in liquid tin have been investigated as a function of both temperature and composition. The elements studied included palladium, tellurium, rhodium, lithium, calcium, barium, strontium and lanthanum. The temperature range involved was from 700 K to 775 K and compositions from zero to 10 atomic percent solute were investigated. Heats of formation of several intermediate solid phases in the palladium-tin, tellurium-tin, rhodium-tin and lanthanum-tin systems have also been determined. Liquid densities of pure tin and palladium-tin alloys have been measured as a function of temperature and alloy composition. In all alloy systems the partial molar heat of solution of the solute in liquid tin is large and negative, ranging from a minimum value of -7600 calories/g-atom for tellurium at 775 K to a maximum value of -67,000 calories/g-atom for lanthanum at 725 K. The values for the other solutes involved are in the range -25,000 calories/g-atom to -42,000 calories/g-atom. This highly exothermic heat of solution indicates a high degree of association between solute atoms and solvent atoms in the liquid state. This conclusion is supported by both the heat of formation measurements and the density measurements. The heats of formation of the intermediate phases in the palladium-tin system are slightly more exothermic than the heat of solution of palladium in liquid tin. This difference can be attributed to the energy necessary to melt the solid intermediate phase, thus forming molecular type liquid. Density measurements on the palladium-tin system also indicate a high degree of solute-solvent bonding in the liquid state. (Author)
AD-655 508 HC$3.00 MF$0.65

IRON AND IRON-CHROMIUM ALLOY SILICA REACTION STUDIES.
Interim rept. 1 Dec 65-30 Nov 66,
Dartmouth Coll Hanover N H Thayer School of Engineering
D. R. Muzyka, and G. A. Colligan. Nov 66, 143p
AMRA-CR-67-07/1
Contract DA-19-020-AMC-00508 (X)

Descriptors: (*Iron alloys, Reaction kinetics), (*Silicon dioxide, Iron alloys), Chromium alloys, Phase studies, Chemical equilibrium, Interfaces, Interactions, Casting.

This investigation is concerned with the chemical reactions that occur when iron and iron-chromium alloys, which are the basis for high strength steels, are held in contact with silica. The results show that the addition of chromium to the equilibrium system Fe-Si-C-O causes additional condensed phases to occur. Under reducing conditions, the phase iron-chromium spinel with composition between magnetite ($FeO.Fe_2O_3$) and chromite ($FeO.Cr_2O_3$) occurs. High Temperatures, 1550 and 1600C, led to the stability of silicate liquid at reducing conditions due to the melting of the spinel phase. This effect lowers the oxidation potential necessary to completely inhibit metal-silica interaction in the presence of chromium compared to pure iron. The general mechanism of metal transport across the mold-metal interface in silica refractory during the casting process is shown to involve liquid metal oxide formation, penetration and solution of the silica, precipitation of solid complex oxides and finally the reduction of a portion of this oxide to metal. The beneficial effect of chromium in slowing these reactions is the promotion of solid phase formation, increased viscosity of the silicate liquid, decreased solution rate of silica and decreased rate of supply of catalyst ions to the primary reaction interface.
AD-655 584 HC$3.00 MF$0.65

SURVEY OF DEFORMATION PROCESSES AND DEFORMATION CHARACTERISTICS OF DIFFICULT TO FORM METALS.
Battelle Memorial Inst Columbus Ohio Columbus Labs
For primary bibliographic entry see Field 13H.
AD-655 623 HC$3.00 MF$0.65

ON THE AlB2 TYPE PHASES,
Texas Univ Austin Dept of Chemical Engineering
For primary bibliographic entry see Field 20B.
AD-655 743 Not available from CFSTI.

A STUDY OF THE BUSTERING OF METAL SURFACES BY SOLAR SYSTEM IONS FINAL REPORT.

Avco Corp., Tulsa, Okla. Oklahoma Univ. Research Inst., Norman. Electronics Div.
L. H. Milacek, and J. R. Wolfe. Jun 67, 94p
NASA-CR-85570, TR-G-230-F
Contract NASW-1431
Prepared Jointly With Oklahoma Univ.

Descriptors: *Aluminum, *Damage, *Gold, *Proton irradiation, Annealing, Blister, Control, Electron, Hydrogen, Irradiation, Low energy, Microscopy, Optical, Pit, Proton, Space flight, Surface, Thermal.

For abstract, see STAR 05 17.
N67-30889 HC$3.00 MF$0.65

THE MECHANISM OF HYDROGEN EMBRITTLEMENT IN STEEL.
Stanford Univ., Calif. Dept. of Materials Science.
A. S. Tetelman. Jul 67, 63p NASA-CR-85771, SU-DMS-67-27
Grant NSG-622

Descriptors: *Embrittlement, *Hydrogen, *Stress corrosion, Concentration, Corrosion, Ductility, Fracture, Gas, Geometry, Material, Microcrack, Notch, Nucleation, Particle, Steel, Stress, Structural, Temperature, Tensile.

For abstract, see STAR 05 17.
N67-30934 HC$3.00 MF$0.65

DEVELOPMENT OF A DISPERSION STRENGTHENED NICKEL BASE ALLOY USING THE HIGH INTENSITY ARC PROCESS, TASK II SUMMARY REPORT.
Vitro Labs., West Orange, N. J.
H. M. Mc Cullough, and M. Ortner. 16 Jan 67, 96p NASA-CR-85780
Contract NAS3-7275

Descriptors: *Nickel alloy, *Powdered metal, Alloy, Aluminum, Billet, Cobalt, Density, Dispersion, Electron, Lanthanum, Magnesium, Metal, Metallography, Microhardness, Molybdenum, Nickel, Optical, Oxide, Powder, Thermostability, Thorium, Tungsten, Yttrium.

For abstract, see STAR 05 17.
N67-31129 HC$3.00 MF$0.65

DEVELOPMENT OF PROTECTIVE COATINGS FOR CHROMIUM-BASE ALLOYS SEMIANNUAL PROGRESS REPORT.
Battelle Memorial Inst., Columbus, Ohio.
For primary bibliographic entry see Field 11C.
For abstract, see STAR 05 17.
N67-31162 HC$3.00 MF$0.65

A STUDY OF THE ADHESION AND COHESION OF METALS SECOND INTERIM SUMMARY REPORT, 9 MAR. 1966 - 9 MAR. 1967.
National Research Corp., Cambridge, Mass.
M. J. Hordon. 1967, 30p NASA-CR-85864
Contract NASW-1168

Descriptors: *Adhesion, *Metal-metal bonding, Bonding, Cohesion, Compression, Copper, Efficiency, Film, Force, Interface, Load, Metal, Oxide, Polycrystal, Stress, Surface, Vacuum, Yield.

For abstract, see STAR 05 17.
N67-31207 HC$3.00 MF$0.65

EFFECTS OF ADDITIONS OF NONMETALLICS ON THE PROPERTIES OF VAPOR-DEPOSITED TUNGSTEN.
General Dynamics Corp., San Diego, Calif. General Atomic Div.
J. Chin, J. R. Lindgren, and A. F. Weinberg. Nov 66, 26p NASA-CR-85906, GA-7324
Contract NAS3-6471
Presented At the Houston Thermionic Conversion Specialist Conf., Houston, 2-4 Nov. 1966

Descriptors: *Additive, *Nonmetal, *Tungsten, *Vapor deposition, Brittleness, Carbon, Creep, Ductility, Effect, Fluorine, Grain, Hardness, High temperature, Low temperature, Microstructure, Nitrogen, Oxygen, Porosity, Strength, Temperature, Transition, Yield.

For abstract, see STAR 05 17.
N67-31223 HC$3.00 MF$0.65

DEVELOPMENT OF DISPERSION-STRENGTHENED, NICKEL-MOLYBDENUM, NONOXIDATION-RESISTANT ALLOYS.
New England Materials Lab., Inc., Medford, Mass.
R. C. Nelson, and R. Widmer. Jun 66, 84p
NASA-CR-85779
Contract NAS3-7265

Descriptors: *Dispersion, *Nickel, *Oxidation resistance, *Stress rupture, Alloy, Aluminum oxide, Matrix, Molybdenum, Oxidation, Resistance, Rupture, Stress, Thermal decomposition, Thorium oxide.

For abstract, see STAR 05 17.
N67-31230 HC$3.00 MF$0.65

HALL AND PHOTORESPONSE MEASUREMENTS ASSOCIATED WITH ULTRAVIOLET AND NEAR ULTRAVIOLET DEGRADATION OF THIN ZINC OXIDE FILMS.
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
M. L. Mc Daniel, R. R. Mitchell, and H. J. Watson. May 67, 161p NASA-CR-85834, R-229
Contract NAS8-20166

Descriptors: *Optical reflectivity, *Solar radiation, *Zinc oxide, Carrier, Coating, Degradation, Electric, Exposure, Film, Light, Optics, Oxide, Parameter, Radiation, Reflection, Solar, Spectrum, Surface, Ultraviolet, Visible, Zinc.

For abstract, see STAR 05 17.
N67-31329 HC$3.00 MF$0.65

MOSSBAUER STUDY OF HYDROGEN DIFFUSED IN IRON AND STEELS.
Woodstock Coll., Md.
M. Bielefeld. 1967, 6p NASA-CR-84864
Grant NSG-670

Descriptors: *Adsorption, *Hydrogen, *Metal surface, *Mossbauer effect, Attenuation, Bubble, Cathode, Charge, Effect, Electrolyte, Foil, Iron, Magnetic, Metal, Radiation, Spectrum, Stainless, Steel, Surface, Thickness.

For abstract, see STAR 05 17.
N67-31353 HC$3.00 MF$0.65

KINETICS OF THE FLUORINATION OF BERYLLIUM.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
P. M. Odonnell. Jul 67, 11p NASA-TN-D-3992

Descriptors: *Beryllium compound, *Chemical kinetics, *Fluorination, *Pressure drop, Beryllium, Chemical, Compound, Crystal, Drop, Film, High temperature, Kinetics, Parabolic, Pressure, Quartz, Rate, Slope, Structure.

For abstract, see STAR 05 17.
N67-31368 HC$3.00 MF$0.65

THE ADDITION OF YTTRIUM TO STAINLESS STEELS.
United Kingdom Atomic Energy Authority, Springfields (England). Reactor Fuel Element Lab.
P. D. Parsons. 1967, 7p TRG-1345/S/

Descriptors: *Corrosion resistance, *Stainless steel, *Yttrium, Addition, Alloy, Chromium, Corrosion, Embrittlement, High temperature, Iron, Metallurgy, Nickel, Physical, Property, Resistance, Stainless, Steel.

For abstract, see STAR 05 17.
N67-31373 HC$3.00 MF$0.65

PROTECTIVE COATINGS FOR CHROMIUM ALLOYS SEMIANNUAL REPORT, 1 MAY - 1 NOV. 1966.
Chromalloy Corp., West Nyack, N. Y.
For primary bibliographic entry see Field 11C.
For abstract, see STAR 05 17.
N67-31414 HC$3.00 MF$0.65

STUDIES OF STEEL CORROSION IN HIGH TEMPERATURE WATER AND STEAM QUARTERLY REPORT, 1 OCT. - 31 DEC. 1966.
Societe D Etudes, de Recherches Et D Applications pour L Industrie, Brussels (Belgium).
Dec 66, 112p EURAEC-1796, EUR-3336
Contract EURATOM-087-1 TEEB/RD/
Transl. Into English From French

Descriptors: *Metal corrosion, *Steam, *Steel, *Water, Alloy, Chromium, Corrosion, Hardening, High temperature, Inconel, Iron, Metal, Structure, Zircaloy, Zirconium.

For abstract, see STAR 05 17.
N67-31467 HC$3.00 MF$0.65

PLASTIC DEFORMATION AND RECRYSTALLIZATION OF REFRACTORY COMPOUNDS.
Plasticheskoye Deformirovaniye I Rekristallizatsiya Tugoplavikikh Soyedineniy
Scientific Translation Service, La Canada, Calif.
A. N. Ivanov, and I. P. Kushtalova. Jul 67, 4p
NASA-TT-F-11116
Contract NASW-1496
Transl. Into English From Poroshkovaya Met., Akad. Navk Ukr. Ssr (iev), V. 7, No. 2, 1967 P 13-14

Descriptors: *Cold working, *Metal surface, *Refractory alloy, Alloy, Boride, Carbide, Cold, Metal, Microhardness, Recrystallization, Refractory, Surface, Temperature, Working, X-ray.

For abstract, see STAR 05 17.
N67-31493 HC$3.00 MF$0.65

MATERIALS RESEARCH AT STANFORD UNIVERSITY.
Stanford Univ., Calif. Center for Materials Research.
For primary bibliographic entry see Field 11G.
PB-174 980 HC$3.00 MF$0.65

DEFORMATION TWINNING IN Ni AND F.C.C.Fe-Ni ALLOYS.
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
R. P. Reed. 3 Jan 67, 5p R-425
Pubsished in Philosophical Magazine v15 n137 p1051-5 May 1967.

Descriptors: (*Twinning (Crystallography), *Deformation), (*Nickel, Twinning (Crystallography)), (*Iron alloys, Twinning (Crystallography)), Electron microscopy, Cryogenics, Crystal lattice defects, Crystal structure.

Using electron and optical microscopy techniques, deformation twinning has been found in Ni and

f.c.c Fe-Ni alloys at low temperatures (76-4 degrees K). (Author)
PB-175 619 HC$3.00 MF$0.65

11G. Miscellaneous Materials

PULSED MAGNETIC-FIELD MILLIMETER WAVE GENERATOR.
Stanford Univ., Calif. Microwave Lab.
For primary bibliographic entry see Field 9E.
AD-283 034 HC$3.00

RESEARCH ON DIELECTRICS FOR MICROWAVE ELECTRON DEVICES.
Stanford Research Inst., Menlo Park, Calif.
For primary bibliographic entry see Field 17B.
AD-455 565 HC$3.00

CHEMICAL AND BIOLOGICAL ANALYSIS OF TAN-O-QUIL-QM TREATED WATERFOWL FEATHERS.
Technical rept.,
Army Natick Labs Mass Applied Entomology Group
Haig Markarian, and John J. Pratt, Jr. May 67, 15p
Rept no. AE-8
USA-NLABS-TR-67-85-PR

Descriptors: (* Feathers, Pest control), Tanning, Moistureproofing, Compatibility, DDT.
Identifiers: Tan-O-Quill-QM process.

Prior to being utilized for military purposes, feathers from Government stockpiles are treated with the Tan-O-Quil-QM process which curls the feather quill (see PB-181 455, PB-181 456). The chemical and biological aspects of the compatibility of this treatment with the DDT applied to the feathers for mothproofing purposes were investigated. The results show that: (1) Tan-O-Quil-QM-treated feathers are susceptible to attack by black carpet beetle larvae; (2) DDT-treated feathers which were washed prior to treatment with Tan-O-Quil-QM, retained sufficient DDT (0.21%) to protect the feathers from attack by black carpet beetle larvae; (3) there were no chemical, physical or biological effects of the Tan-O-Quil-QM process on DDT. (Author)
AD-655 283 HC$3.00 MF$0.65

MATERIALS RESEARCH AT STANFORD UNIVERSITY.
Annual rept. no. 5, 1 Jul 65-30 Jun 66.
Stanford Univ., Calif. Center for Materials Research.
Dec 66, 175p
See also AD-629 013.

Descriptors: (* Materials, Scientific research), (* Solid state physics, Reviews), (* Metallography, Reviews), (* Crystallography, Reviews), Acoustics, Electromagnetic waves, Spectroscopy, Nuclear magnetic resonance, Cyclotron resonance phenomena, Catalysis, Photoelectric effect, Polymers, Semiconductors, Lasers, Quantum mechanics, Crystal lattice defects, Band theory of solids, Chemical reactions, Carriers (Semiconductors), Oxides, Rock (Geology), Thermochemistry, Reaction kinetics, Concrete, Mechanics, Crystal structure, Alloys, Composite materials, Minerals, Magnetic materials.

The report contains brief descriptions of the various individual materials research programs active during FY '66, arranged alphabetically by the name of the principal investigator. Also included are lists of publications, doctoral dissertations, faculty and senior staff members, research associates, graduate students and degrees awarded. Finally, a name index is included for convenience in locating references to the activities of specific investigators.
PB-174 980 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF MINERAL WOOL.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 525 HC$3.00 MF$0.65

11H. Oils, Lubricants, and Hydraulic Fluids

GREASES. EFFECTS OF COMPOSITION AND SHEAR RATE ON MECHANICAL STABILITY.
Technical rept.,
Army Weapons Command Rock Island Ill Research and Engineering Div
Robert L. Young. Apr 67, 24p
RIA-67-1075

Descriptors: (* Greases, Stability), Additives, Viscosity, Shear stresses, Penetration.
Identifiers: Metallic soaps, Thickening agents.

Seventeen greases were shear worked at ambient temperatures by three different shear methods. The approximate shear rates of these methods were 20/sec., 450/sec., and 10,000/sec. The breakdown of the greases was evaluated by consistency changes as determined by the 1/4 scale worked penetration, ASTM Federal Test Method D-1403. It was found that the greases made with synthetic thickeners were usually more shear stable than those made with soap base thickeners. In a majority of greases the higher the rate of shear, the greater the breakdown. (Author)
AD-655 275 HC$3.00 MF$0.65

THE RESISTANCE OF GREASE LUBRICATED METAL COMBINATIONS TO FRETTING DAMAGE.
Army Weapons Command Rock Island Ill Research and Engineering Div
For primary bibliographic entry see Field 11F.
AD-655 276 HC$3.00 MF$0.65

FACTORS AFFECTING SONIC DEGRADATION OF POLYMER SOLUTIONS.
Technical rept.,
Army Weapons Command Rock Island Ill Research and Engineering Div
Ralph L. LeMar. 9 Dec 65, 14p
RIA-67-1353
Availability: Published in I/EC Product Research and Development v6 n1 p19-23 Mar 1967.

Descriptors: (* Polymers, Degradation), (* Hydraulic fluids, Acoustic properties), Polyethylene plastics, Acrylic resins, Shear stresses, Viscosity, Stability.
Identifiers: Polyisobutylenes, Sonochemistry.

Linear polymers dissolved in mineral oil were examined for their lability to shear degradation utilizing a sonic oscillator. The tests were performed on several polyisobutylenes and polymethacrylates similar to those used to formulate hydraulic fluids with improved viscosity-temperature slope properties. The shear lability of these additives varied directly with their viscosity-temperature slope improver power. Slope improver power also was lost during sonic degradation, its extent depending upon the viscosity-temperature slope of the unsheared solutions. The relative shear lability of the polymer solutions was affected by the severity level employed in the sonic tests. Polymethacrylate solutions could be degraded further than polyisobutylene solutions when additives of equivalent oil thickening power were used; however, none were sheared to the viscosity level of the base oil. (Author)
AD-655 539 Not available from CFSTI.

DETERMINATION OF ACIDITY IN PETROLEUM PRODUCTS BY THERMOMETRIC TITRIMETRY.
Revised ed.,
Rock Island Arsenal Ill
Charles J. Quilty. 6 Mar 67, 3p Rept no. RIA-67-1953
Revision of manuscript submitted 14 Nov 66.
Availability: Published in Analytical Chemistry v39 p666-8 May 1967.

Descriptors: (* Oils, pH), (* Petroleum, * Volumetric analysis), Thermochemistry, Lubricants, Impurities, Test methods, Accuracy, Heat of reaction.
Identifiers: Heat of neutralization, Thermometric titration.

A method is described for ascertaining the acidity of new and used petroleum oils which involves the titrimetric determination of heat of neutralization. The accuracy of the method is on the same order as the colorimetric and potentiometric methods, but it does not share their primary limitations.
AD-655 589 Not available from CFSTI.

FRICTION OF POLYMER SOLUTIONS
Frankford Arsenal Philadelphia Pa Pitman-Dunn Research Labs
Henry Gisser, and Marce Petronio. 1967, 14p
FA-A67-6
Presented as an American Society of Lubrication Engineers paper at the Lubrication Conference held in Minneapolis, Minnesota, October 18-20, 1966.
Availability: Published in ASLE Transactions v10 p58-66 1967.

Descriptors: (* Lubricants, Additives), (* Polymers, Friction), (* Acrylic resins, Friction), Molecular properties, Substrates, Steel, Glass, Copper, Stainless steel, Concentration (Chemistry), Films, Adsorption.

Friction measurements on steel, glass, and copper with a stainless steel rider on solutions of poly (n-alkyl methacrylate)s show that as the length of alkyl group is increased the coefficient of friction is reduced. The friction values are almost the same as those obtained with n-alkyl acetates having the same alkyl length. Changes in concentration from 0.01 to 10 mg/ml yield at most an insignificant increase in friction. The progressive friction reduction with increasing alkyl length is explained in terms of increasing lateral interactions of the adsorbed polymer film with increasing fraction of alkyl lengths having one free end. These lateral interactions lead to progressively increasing rigidity which contributes to friction reduction. Measurements with copolymers of n-hexadecyl methacrylate and methacrylic acid show minimum friction with approximately 50% of methacrylic acid indicating that strongly polar groups which can interact with the surface and long alkyl groups both contribute to friction reduction. When either is decreased in concentration in the film near the surface, friction increases. (Author)
AD-655 598 Not available from CFSTI.

DRAG OF BLUNT BODIES IN POLYMER SOLUTIONS,
Naval Ordnance Test Station China Lake Calif
For primary bibliographic entry see Field 20D.
AD-655 616 MF$0.65

INORGANIC SALTS IN MAHOGANY SULFONATES AND THEIR EFFECT ON PETROLEUM HYDRAULIC FLUIDS,
Frankford Arsenal Philadelphia Pa Pitman-Dunn Research Labs
Joseph Messina, and Abraham Mertwoy. Feb 67, 11p
FA-A67-4
Presented at the ASLE Annual Meeting (21st),

Pittsburgh, May 2-5, 1966.
Availability: Published in Journal of the American Society of Lubrication Engineers Feb 1967.

Descriptors: (* Hydraulic fluids, * Antioxidants), (* Sulfonates, Hydraulic fluids), Impurities, Salts, Corrosion, Calcium compounds, Halides, Sulfates.
Identifiers: Mahogany sulfonates.

A series of mahogany sulfonate rust inhibitors used in compounding qualified petroleum hydraulic fluids was studied in connection with the inoperability of tank hydraulic systems after short storage periods of six to nine weeks. Examination of the disassembled hydraulic components showed severe staining and rusting in valving areas having extremely critical tolerances. Analyses of the sulfonates indicated the presence of inorganic water soluble salts (calcd. as calcium chloride and calcium sulfate) ranging from 0.02 to 0.19 percent. It was found that the hydraulic fluids used in the tanks which did not perform satisfactorily contained sulfonates having a relatively high chloride salt content of 0.12 percent, while the use of hydraulic fluids with sulfonates containing less than 0.03 percent of the halide salt permitted satisfactory operation. Data are also presented which show that the concentrations of inorganic salts found in the commercial mahogany sulfonates studied do not appear to significantly affect the rust prevention properties of the sulfonates but their presence does promote corrosion due to galvanic action. A correlation was established between laboratory galvanic corrosion tests and performance tests in tank and mock-up systems. (Author)
AD-655 678 Not available from CFSTI.

HIGH TEMPERATURE EVAPORATION TESTER AND METHOD FOR DETERMINING VOLATILITY OF FLUIDS AND SEMISOLID MATERIALS.
Air Force Materials Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 14B.
AD-655 790 HC$3.00 MF$0.65

11I. Plastics

FUNGUS TESTS ON POLYVINYL CHLORIDE FILMS PLASTICIZED WITH THREE PLASTICIZERS.
Frankford Arsenal, Philadelphia, Pa. Pitman-Dunn Research Labs.
Sigmund Berk. Jan 49, 20p Rept. no. 2 FA-R-889

Descriptors: (* Polyvinyl chloride, * Fungus deterioration), (* Plasticizers, Fungusproofing), Fatty acid esters, Butadienes, Acrolonitrile polymers, Molds (Organisms), Inhibition, Tensile properties, Elongation, Phthalates.
Identifiers: Dibutyl sebacates, Dioctyl phthalates.

Fungus resistance and tensile strength tests were conducted on polyvinyl chloride plastic films formulated with three plasticizers. The film with dibutyl sebacate as the plasticizer was very susceptible to Aspergillus flavus and to a species of Penicillium and Trichoderma. The dibutyl sebacate plasticized film which was inoculated with the species of Trichoderma showed a large increase in the tensile strength and a significant decrease in the percentage elongation. The increase in tensile strength is attributed to the removal of the plasticizer from the film by the mold. The polyvinyl chloride films formulated with dioctyl phthalate or butadiene-acrylonitrile as the plasticizers showed only slight susceptibility to the species of Trichoderma used. At the end of a 6 weeks' incubation period, the two plastic films exhibited only insignificant changes in the tensile strength and percentage elongation. In so far as resistance to fungi is concerned, it is concluded that dioctyl phthalate and butadiene-acrylonitrile are satisfactory plasticizers for this polyvinyl chloride plastic formulation.
AD-222 471 HC$3.00

INVESTIGATION OF THE EFFECTS OF RADIANT HEAT ON THE STRUCTURAL EFFICIENCY OF AIRCRAFT AND MISSILE COMPONENTS MADE OF GLASS-FIBER-REINFORCED PLASTIC LAMINATES.
Final engineering rept.,
Naval Air Engineering Center Philadelphia Pa Aeronautical Structures Lab
E. Alter. 30 Apr 67, 54p Rept no. NAEC-ASL-1112

Descriptors: (* Laminated plastics, Test methods), (* Reinforced plastics, Test methods), (* Aerodynamic heating, * Airframes), Thermal radiation, Damage, Infrared radiation, Convection (Heat transfer), Glass textiles, Failure (Mechanics), Analysis of variance, Experimental design, Guided missiles, Structural parts, Heating.

The investigation was performed to compare, by means of a controlled experiment, the effects produced by radiant heat with those produced by convective heat in aircraft structures fabricated of glass-fiber-reinforced plastic laminates. A complete 6-factor experiment was designed and analyzed statistically. The six main factors were heat source, size effect, shielding, quality control, post-cure temperature, and heating rate. Each factor had two levels; the experiment was replicated twice. Three separate studies with various thermal conditions were made with flat beams and cylinders. In all the studies, the analysis-of-variance method showed no difference between the effects of radiant and convective heat at the 5-percent level of significance. The difference between two manufacturers' quality controls were significant in some of the studies, but the difference due to shieldings was not significant. Size effect results were considered inconclusive because of some of the experimental problems involved. (Author)
AD-655 442 HC$3.00 MF$0.65

AN EVALUATION OF SILICONE RUBBER TUBING AS A REPLACEMENT OF THE COMMON BILE DUCT,
Naval Medical Research Inst Bethesda Md
For primary bibliographic entry see Field 6E.
AD-655 692 Not available from CFSTI.

OCEANOGRAPHIC EFFECTS ON PLASTIC ENGINEERING MATERIALS,
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
H. J. Lee. 23 Jun 67, 25p Rept no. NAEC-AML-2628

Descriptors: (* Plastics, Environmental tests), (* Reinforced plastics, Environmental tests), Sea water, Degradation, Acrylic resins, Polyester plastics, Epoxy plastics, Phenolic plastics, Flexural strength, Modulus of elasticity, Tensile properties, Compressive properties.

The continuing investigation of oceanographic influences on a wide spectrum of plastic engineering materials, reinforced laminates and other plastics, has been in progress. Submersible Test Unit II-2 (STU II-2) test panel array, which is discussed, represents one segment of this continuing effort. This panel array was submerged 13 April 1965 for 402 days at a depth of approximately 2,370 feet in the Port Hueneme Pacific Ocean Area. Due to circumstances beyond control, mechanical evaluation of specimens were not conducted until approximately eleven months after retrieval. However, the evaluation indicated that, in the main, the mechanical properties were adversely affected to a greater degree than those of specimens in previous exposures. (Author)
AD-655 817 HC$3.00 MF$0.65

11J. Rubbers

PREPARATION OF RUBBER SPECIMENS FROM FINISHED RUBBER ITEMS,
Detroit Arsenal, Center Line, Mich.
Fred W. Smith. 4 Feb 57, 58p Rept. no. 3812

Descriptors: (*Rubber, Test methods), Manufacturing methods.

The paper is a manual incorporating the techniques developed in the Materials Laboratory, Detroit Arsenal, for the preparation of rubber specimens from finished rubber items. The manual was organized into nine illustrated chapters. All of the preparative techniques used by the Detroit Arsenal have been concentrated into this manual. (Author)
AD-123 666 HC$3.00

THE SYNTHESIS OF SPECIAL FLUORINE-CONTAINING MONOMERS.
Colorado Univ Boulder
For primary bibliographic entry see Field 7C.
AD-655 537 HC$3.00 MF$0.65

11L. Wood and Paper Products

THERMAL CONDUCTIVITY OF WOOD-BASE FIBER AND PARTICLE PANEL MATERIALS.
Research paper,
Forest Products Lab., Madison, Wis.
Wayne C. Lewis. Jun 67, 16p FPL-77
Prepared in cooperation with Wisconsin Univ., Madison.

Descriptors: (*Fiberboard, Thermal conductivity), (*Wood, Thermal conductivity), Panels (Structural), Heat transfer, Binders, Test equipment, Thermal insulation.
Identifiers: Particle board.

An evaluation was made of the heat-flow properties of a representative group of wood-base fiber and particle panel materials. Results show that for most purposes thermal conductivity may be predicted on the basis of density. Separate design curves are presented for particleboards and the building fiberboards. Methods for estimating the conductivity at other than usual mean temperatures are also presented. Laboratory equipment and procedures used in the study are fully described. (Author)
PB-175 520 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF SOUVENIRS AND SMALL JEWELRY.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 540 HC$3.00 MF$0.65

MICROSCOPIC OBSERVATIONS OF ULTRAVIOLET IRRADIATED AND WEATHERED SOFT WOOD SURFACES AND CLEAR COATINGS.
Research paper,
Forest Products Lab., Madison, Wis.
Victor P. Miniutti. May 67, 37p FPL-74
Prepared in cooperation with Wisconsin Univ., Madison.

Descriptors: (*Wood, Degradation), (*Plastic coatings, Effectiveness), (*Weatherproofing, Wood), Ultraviolet radiation, Microstructure, Stabilization, Cells (Biology), Finishes + finishings, Crazing, Silicone plastics, Phenolic plastics, Vinyl plastics, Embrittlement.

Reflected-light and fluorescence microscopy were used to observe changes in unfinished or clear-coated wood surfaces, and in the coatings during ultraviolet irradiation in the laboratory and during

weathering. New findings relate laboratory irradiation to weathering and reveal some effects of wood structure and properties of wood and coatings on the exterior performance of clear-coated wood. The results demonstrate the need for treatments that will dimensionally stabilize exterior wood surfaces and minimize their photodegradation. They also indicate changes needed in the properties of commonly used exterior varnishes to obtain greater durability for them on wood surfaces. (Author)
PB-175 557 HC$3.00 MF$0.65

THE PREPARATION AND PURIFICATION OF CELLOBIOSE-1-C14.
Forest Products Lab., Madison, Wis.
For primary bibliographic entry see Field 7E.
PB-175 558 HC$3.00 MF$0.65

FOREST PRODUCTS LABORATORY LIST OF PUBLICATIONS ON WOOD PRESERVATION.
Forest Products Lab., Madison, Wis.
Jun 67, 31p
Prepared in cooperation with Wisconsin Univ., Madison.

Descriptors: (*Wood, Preservation), (*Preservation, Bibliographies), Degradation, Additives, Coatings, Marine borers, Heat, Weatherproofing, Effectiveness.

The list includes publications that give general information and the results of research by the Forest Products Laboratory on preservative materials, methods of application, durability and service records of treated and untreated wood in various forms. (Author)
PB-175 559 HC$3.00 MF$0.65

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

THE GENERATION OF RANDOM NUMBERS FROM VARIOUS PROBABILITY DISTRIBUTIONS.
Master's thesis,
Naval Postgraduate School, Monterey, Calif.
John E. Howe. 1965, 75p

Descriptors: (*Probability, Numerical methods and procedures), Programming (Computers), Distribution theory, Statistical tests, Numerical analysis, Statistical distributions.
Identifiers: Random number generator, Fortran 63, CODAP.

Methods are developed, and Fortran 63 CODAP computer programs are demonstrated, to generate random numbers from the uniform, normal (including multivariate normal), Poisson, and exponential probability distributions. Various statistical tests are described and the results of the application of these tests to the generators are tabulated. A general method for generating random numbers from a large class of distributions is described. The methods of generation are optimized to provide an accurate generator while producing numbers at a maximum rate. The uniform generator that is used as a basis for the other generators is of the congruential type and is capable of generating 1800 numbers per second. (Author)
AD-475 568 HC$3.00 MF$0.65

LIKELIHOOD RATIO TESTS FOR RESTRICTED FAMILIES.
Boeing Scientific Research Labs Seattle Wash Mathematics Research Lab
Richard E. Barlow. Jun 67, 35p Rept no. D1-82-0620, Mathematical note-514
Prepared in cooperation with California Univ., Berkeley. Operations Research Center, Contract Nonr-3656 (18), ORC-67-16.

Descriptors: (*Statistical analysis, Reliability), Sampling, Distribution functions, Theorems, Inequalities, Stochastic processes, Mathematics.
Identifiers: Likelihood ratio tests.

Likelihood ratio tests for the problem: H0: F epsilon G1 versus H1: F epsilon G- G1 are defined for certain nonparametric families of distributions G and G1. In particular the likelihood ratio test is defined and shown to be unbiased when G1 denotes the exponential distributions (possibly truncated) and G denotes the distributions with increasing failure rate. Comparisons are made with competing tests. The problem of testing for increasing failure rate average is also examined. (Author)
AD-655 200 HC$3.00 MF$0.65

OPTIMAL ADAPTIVE FILTER REALIZATIONS FOR SAMPLE STOCHASTIC PROCESSES WITH AN UNKNOWN PARAMETER,
Texas Univ Austin Dept of Electrical Engineering
For primary bibliographic entry see Field 9D.
AD-655 214 Not available from CFSTI.

BORDER REDUCTION IN EXISTENCE PROBLEMS OF HARMONIC FORMS,
California Univ Los Angeles
Mitsuru Nakai, and Leo Sario. 22 Jun 66, 11p
AROD-1517:99
Grant DA-ARO (D)-31-124-G742
Prepared in cooperation with Nagoya Univ. (Japan).
Availability: Published in Nagoya Mathematical Journal v29 p137-43 Mar 1967.

Descriptors: (*Algebraic topology, Boundary value problems), Inequalities, Theorems, Mathematics.

Given an arbitrary Riemannian n-space V, let sigma be a harmonic field in the complement V-Vo of a regular region Vo. This paper shows that the border delta Vo can be reduced, in a sense to be specified, to an (n-1) sphere. Thus one may perform all calculations in Vo in terms of one coordinate system.
AD-655 226 Not available from CFSTI.

ON THE STATISTICAL PROPERTIES OF TRANSIENT NOISE SIGNALS,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20A.
AD-655 228 HC$3.00 MF$0.65

AN ALGORITHM FOR AN AUTOMATIC GENERAL POLYNOMIAL SOLVER.
Technical rept.,
Stanford Univ Calif Dept of Computer Science
M. A. Jenkins, and J. F. Traub. 21 Jul 67, 42p Rept no. CS-71
Contract Nonr-225 (37)
Prepared in cooperation with Bell Telephone Labs., Inc., Murray Hill, N. J. Presented at a Symposium on Constructive Aspects of the Fundamental Theorem of Algebra, Ruschlikon, Switzerland, June 5-7, 1967.

Descriptors: (*Polynomials, Equations), (*Algorithms, Polynomials), Flow charting, Iterative methods, Mathematics, Theorems, Inequalities.

A restriction-free algorithm for a general automatic polynomial equation solver is described and its implementation as an ALGOL program is discussed. The First Stage of the algorithm is a preprocessing step which guarantees that the iterative Second Stage will converge. The zeros are found one or two at a time and in increasing order of magnitude which guarantees stable deflation. The algorithm automatically decides when to switch to Stage Two and the decision is made easily for a zero which is 'easy' to calculate. Flowcharts for the program are given and numerical results are presented for 3 hard problems. The present program is a research program and certain improvements will have to be made before the program could serve as a general library routine. (Author)
AD-655 230 HC$3.00 MF$0.65

RECURSIVE ALGORITHMS FOR PATTERN CLASSIFICATION.
Technical rept.,
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
Colin C. Blaydon. Mar 67, 172p Rept no. TR-520
Contracts Nonr-1866 (16), Nonr-1866 (07)

Descriptors: (*Pattern recognition, Decision theory), (*Algorithms, Pattern recognition), Theses, Stochastic processes, Probability density functions, Random variables, Control, Optimization.

This research is concerned with recursive algorithms for constructing decision functions in pattern classification problems. The principal objective of this thesis is to provide a comprehensive interpretation that will be a common basis for (i) discussing the heretofore fragmented collection of existing algorithms and (ii) deriving new algorithms. All of the algorithms will be discussed as methods for minimizing pre-specified criterion functions. In deterministic pattern classification problems (those problems where there are a fixed, finite number of patterns each having a unique classification), the recursive algorithms are interpreted as special cases of a general gradient descent algorithm. In stochastic pattern classification problems (where the classification of a particular pattern is not unique but is expressed as a probability), the recursive algorithms are found to be special cases of a general stochastic approximation algorithm. This algorithm is the stochastic analog of the deterministic gradient descent algorithm. The stochastic approximation algorithm is also useful for approximating probability distribution and density functions. In this problem, there is no information about the unknown distribution of density functions being approximated. Only samples of the random variables are available. In the final chapter, the recursive algorithms are applied to problems in optimal control, estimation, and pattern classification. (Author)
AD-655 239 HC$3.00 MF$0.65

FALSE ALARM PROBABILITY OF A QUADRATURE CLIPPER CORRELATOR FOR A POISSON NOISE PROCESS.
Navy Electronics Lab San Diego Calif
For primary bibliographic entry see Field 9E.
AD-655 244 HC$3.00 MF$0.65

PARTIAL REGULARITY RESULTS FOR NONLINEAR ELLIPTIC SYSTEMS.
Technical rept.,
California Univ Berkeley Dept of Mathematics
Charles B. Morrey, Jr. Jun 67, 35p
Contract Nonr-222 (62)

Descriptors: (*Partial differential equations, Theorems), Mathematics.
Identifiers: Sobolev's space.

The paper discusses solutions z = (z superscript 1, ..., z superscript N), in which each z superscript i belongs to the Sobolev space (H subscript k, superscript mi) (G) for some mi = or > 1, of the equations the integral over G of (summation from i = 1 to i = N, summation sign, subscript (absolute value of alpha = or < mi), zeta superscript i, prefix subscript alpha, A subscript i, superscript alpha, (x, D3) dx) = o for all zeta epsilon C subscript c, superscript infinity symbol, (G).
AD-655 293 HC$3.00 MF$0.65

SARIO'S POTENTIALS AND ANALYTIC MAPPINGS,

California Univ Los Angeles
Mitsuru Nakai. 28 May 66, 13p
AROD-1517:95
Grant DA-ARO (D)-31-124-G742
Prepared in cooperation with Nagoya Univ. (Japan).
Availability: Published in Nagoya Mathematical Journal v29 p93-101 Mar 1967.

Descriptors: (*Complex variables, Mapping (Transformations)), (*Potential theory, Theorems), Sequences, Mathematics, Inequalities.
Identifiers: Sario's potentials.

In order to extend Nevanlinna's first and second fundamental theorems to arbitrary analytic mappings between Riemann surfaces, Sario introduced a kernel function on an arbitrary Riemann surface generalizing the elliptic kernel on the Riemann sphere. Because of the importance of the potential theoretic method in the value distribution theory, we discussed potentials of Sario's kernel in a later paper. In that paper the validity of Frostman's maximum principle for Sario's potentials was left unsettled. The main object of this paper is to resolve this question (Theorem 1). As a consequence the fundamental theorem of the potential theory is obtained in its complete form for Sario's potentials (Theorem 2). These results are applied to analytic mappings f of an arbitrary parabolic or regular hyperbolic Riemann surface R into an arbitrary Riemann surface S and show that among Nevanlinna's fundamental functions the relation N (r,a) = T (r) + O (the square root of T (r), log T (r)) holds for every a in S except those of a set of capacity zero (Theorem 4). This includes the known covering property of the Riemannian image of R under f over S. Here capacity means logarithmic one, considered locally.
AD-655 302 Not available from CFSTI.

INEQUALITIES ASSOCIATED WITH QUADRATIC FORMS,
Maryland Univ College Park
Monroe H. Martin, and George N. Trytten. 23 Nov 66, 9p
AROD-407:70
Grant DA-ARO (D)-31-124-G676
Availability: Published in Atti della Accademia delle Scienze di Torino v101 p285-90 1966/1967.

Descriptors: (*Inequalities, Theorems), Mathematics.

We consider an inequality of the classic type of Cauchy-Schwarz, which involves a real quadratic form and the corresponding bilinear (symmetric) form. If this form is indefinite it is proved that, under particular hypotheses, an inequality exists which is opposite to those of Couchy-Schwarz. (Author)
AD-655 303 Not available from CFSTI.

FUNCTION THEORY IN COMPACT RIEMANN SURFACES,
Stanford Univ Calif Dept of Mathematics
H. L. Royden. 31 Jan 66, 38p
AROD-1323:36
Contract DA-31-124-ARO (D)-170
Availability: Published in Journal d'Analyse Mathematique v18 p295-327 1967.

Descriptors: (*Potential theory, Complex variables), (*Functions, Complex variables), Green's function, Analytic functions, Power senses, Theorems, Mapping (Transformations), Mathematics.

The purpose of this paper is to give a systematic development of potential theory and function theory on a compact Riemann surface W using the method of orthogonal projection as developed by Ahlfors and de Rham and to establish representations using the Green's function of the surface in a manner similar to that of Garabedian and Schiffer for plane domains. The first section gives an exposition of the method of orthogonal projection and uses it to solve Poisson's equation. This is used in the next sections to show the existence of the Green's function and more generally of a harmonic function with given singularities satisfying the flux condition. In section 6 the problem of constructing analytic functions with given singularities and with prescribed power series development up to a given order at certain points is considered. If F is a locally defined function with this prescribed behavior, it is shown that there is a globally defined function with this behavior if and only if the sum of the residues of Fw is zero for each meromorphic differential w on W such that the residues depend only on w and the given data. (Author)
AD-655 308 Not available from CFSTI.

ON THE DETERMINATION OF THE GENERAL TERM IN GREENTYPE EXPANSIONS.
Revised ed.,
California Univ San Diego La Jolla Inst for Radiation Physics and Aerodynamics
S. Jorna. 30 Jun 66, 16p
AROD-5133:113
Contract DA-31-124-ARO (D)-257, ARPA Order-0570
Revision of manuscript submitted 1 Feb 66.
Availability: Published in Proceedings of the Royal Society of Edinburgh Section A (Mathematical and Physical Sciences) v67 n19 pt4 p243-55 1967.

Descriptors: (*Differential equations, *Bessel functions), Transformations (Mathematics), Power series, Exponential functions, Mathematics.

A formal method is developed for deriving a series expansion of the general term in Green-type expansions. The technique is exemplified by detailed calculations for modified Bessel functions of large order. (Author)
AD-655 309 Not available from CFSTI.

ONE CAN HEAR WHETHER A DRUM HAS FINITE AREA,
British Columbia Univ Vancouver
Colin Clark, and Denton Hewgill. 19 Jul 66, 5p
AFOSR-67-1602
Grant AF-AFOSR-379-66
Availability: Published in Proceedings of the American Mathematical Society v18 n2 p236-7 Apr 1967.

Descriptors: (*Partial differential equations, Functions), Sequences, Theorems, Operators (Mathematics), Boundary value problems, Matrix algebra, Mathematics.
Identifiers: Eigenvalues.

Let Omega be a quasibounded region in R superscript n, and consider the eigenvalue problem delta u + lambda u = 0 on Omega, with u = 0 on the boundary of Omega. We show first that the function N (lambda) = summation of lambda sub j = or < 1 satisfies lim as lambda approaches infinity, of (lambda to the power -n/2)N (lambda) = c sub n . mu (Omega), a generalization of Weyl's asymptotic law for eigenvalues. In the case mu (Omega) = + infinity we also obtain an upper bound on the growth of the eigenvalues, in the form lim as lambda approaches infinity, sup (lambda to the power -2K)N (lambda) < + infinity for certain integer k. (Author)
AD-655 332 Not available from CFSTI.

INTEGRAL REPRESENTATIONS OF INVARIANT STATES ON B-ALGEBRAS,
State Univ of New York Stony Brook
O. Lanford, and D. Ruelle. 1967, 12p
AFOSR-67-1559
Grant AF-AFOSR-1096-66

Descriptors: (*Algebra, Theorems), Algebraic topology, Groups (Mathematics), Hilbert space, Inequalities, Mathematics.

Let Q be a B* - algebra with a group G of automorphisms and K be the set of G-invariant states on Q. We discuss conditions under which a G-invariant state has a unique integral representation in terms of extremal points of K, i.e. extremal invariant states. (Author)
AD-655 336 HC$3.00 MF$0.65

INTEGRAL REPRESENTATIONS ON COMPACT CONVEX SETS (CHOQUET THEORY),
State Univ of New York Stony Brook Dept of Physics
Oscar E. Lanford. 30 Aug 66, 24p Rept no. Internal rept-4
AFOSR-67-1560
Grant AF-AFOSR-1096-66
Summer symposium on Theoretical Physics. Prepared in cooperation with New York State Science and Technology Foundation.

Descriptors: (*Convex sets, *Topology), (*Set theory, Integration), Algebra, Theorems, Integrals, Measure theory, Statistical mechanics, Quantum statistics, Invariance, Functions.
Identifiers: Choquet theory.

These notes attempt to give an introduction to the theory of integral representations on compact convex sets developed first by G. Choquet and later by numerous other authors. They do not aim at completeness, but only at the presentation of the central results. The notes do attempt to give the proofs in sufficient detail to make them accessible to the non-specialist. It is assumed the reader has an elementary knowledge of point set topology, integration theory on locally compact spaces, and the theory of locally convex topological vector spaces.
AD-655 379 HC$3.00 MF$0.65

INCLUSION - PROBABILITY - OPTIMAL CONTROL,
Polytechnic Inst of Brooklyn N Y Dept of Electrical Engineering
Leo J. Van Mellaert. 25 May 67, 89p Rept no. PIBMRI-1364-67
AFOSR-67-1229
Contract AF 49 (638)-1402

Descriptors: (*Stochastic processes, Control), (*Control, Optimization), Probability, Dynamic programming, Partial differential equations, Numerical analysis, Dynamics, Statistical processes.

A multi-dimensional stochastic dynamical system is considered. The system can be nonlinear and time-varying. It is assumed that the state of this system can be measured noisefree at all times. An optimal control policy is formulated leading to the maximization of the probability of constraining the trajectory of the system to a certain subregion of the state-space over a finite period of time. On the basis of dynamic programming an optimization equation is derived. This equation is a quasilinear second order parabolic partial differential equation. The equation is solved on a digital computer. The numerical technique appears to be highly efficient in speed and memory requirements. Examples are included for first and second order dynamical systems. (Author)
AD-655 387 HC$3.00 MF$0.65

INVERSE CONVOLUTION FILTERS: AN ITERATIVE TECHNIQUE,
Texas Univ Austin Dept of Electrical Engineering
For primary bibliographic entry see Field 14C.
AD-655 405 Not available from CFSTI.

PERTURBATIONS OF NONLINEAR SYSTEMS OF DIFFERENTIAL EQUATIONS, II,
Wisconsin Univ Madison
Fred Brauer. 1967, 20p
AROD-5003:6

Contract DA-31-124-ARO (D)-268
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.
Availability: Published in Journal of Mathematical Analysis and Applications v17 n3 p418-34 Mar 1967.

Descriptors: (* Perturbation theory, * Nonlinear differential equations), (* Asymptotic series, * Operators (Mathematics)), Problem solving, Linear systems, Matrix algebra, Convex sets, Stability, Inequalities.

The analogue of the variation of constants formula for nonlinear systems has been applied to the study of stability and asymptotic behavior of nonlinear systems in a previous paper. The purpose of this paper is to improve the results of that paper in two ways and to give further applications. More versatile and more easily calculated bounds are obtained by using more general bounds for solutions of linear systems. A condition imposed in the earlier paper which was required to be satisfied by the variational system with respect to each solution in a given region is relaxed to the analogous condition on the variational system with respect to only the zero solution. In addition, some applications to problems of asymptotic stability and asymptotic behavior are obtained. Finally, a variant of the formula is developed which leads to results on asymptotic equivalence of two nonlinear systems.
AD-655 409 Not available from CFSTI.

ACCURATE AND STABLE NUMERICAL SOLUTIONS TO THE SCHRODINGER EQUATION,
Naval Research Lab Washington D C
Carl A. Rouse. 23 Jun 67, 28p Rept no. NRL-6558

Descriptors: (* Partial differential equations, * Quantum mechanics), (* Numerical analysis, Partial differential equations), Taylor's series, Hydrogen, Transformations (Mathematics), Wave functions, Initial value problems.
Identifiers: Schrodinger equation, Eigenvalues, Coulomb potential.

A new method has been presented for accurate and stable numerical solutions of ordinary differential equations. Applied to the Schrodinger equation the two essential features of the method are (a) simultaneous Taylor expansions between space steps delta rho of the wave function R (rho) and the slope of the wave function m (rho), and (b) the derivation of initial values through either an exact series solution of the Schrodinger equation valid at or near the origin, or through an approximate analytical solution valid for all n and l to terms of order rho superscript 2 - O (rho superscript 2). As far as the author can determine, the present results represent the first known accurate and stable numerical solutions of the radial hydrogenic Schrodinger equation. With the present ability to calculate eigenvalues to nine or more significant figures and eigenfunctions to nine or more decimal places, the present method becomes an alternative to perturbation and variational methods.
AD-655 439 HC$3.00 MF$0.65

THE STRUCTURE OF POLYNOMIAL AND FOURIER COEFFICIENT MATRICES.
Northwestern Univ Evanston Ill Dept of Geology
For primary bibliographic entry see Field 8B.
AD-655 445 HC$3.00 MF$0.65

THE GENERAL LINEAR MODEL IN MAP PREPARATION AND ANALYSIS, PART II.
Northwestern Univ Evanston Ill Dept of Geology
For primary bibliographic entry see Field 8B.
AD-655 446 HC$3.00 MF$0.65

RATE OF CONVERGENCE IN SINGULAR PERTURBATIONS.
Technical rept.,
Kansas Univ Lawrence Dept of Mathematics
W. M. Greenlee. Jun 67, 76p Rept no. TR-12
Contract Nonr-583 (13), Grant NSF-GP-3460

Descriptors: (* Perturbation theory, Boundary value problems), Operators (Mathematics), Mapping (Transformations), Differential equations, Initial value problems, Convergence, Theorems, Hilbert space.

The paper obtains rate of convergence estimates for solutions of singular perturbations of linear elliptic boundary value problems. The problem can be described as follows. Let D be a domain in R superscript n and let epsilon be a positive real parameter. Consider two boundary value problems on D, (epsilon U + B) w subscript epsilon = f, Bu = f, where U and B are elliptic differential operators with the order of U greater than the order of B. The problem is to determine in what sense w subscript epsilon converges to u on D as epsilon drops to 0 and to estimate the rate of convergence. This problem is investigated in the present work with the L superscript 2 theory of elliptic partial differential problems.
AD-655 448 HC$3.00 MF$0.65

UNIFORM ASYMPTOTIC EXPANSIONS OF INTEGRALS WITH STATIONARY POINT NEAR ALGEBRAIC SINGULARITY,
New York Univ N Y Courant Inst of Mathematical Sciences
Norman Bleistein. Dec 65, 19p
AFOSR-67-1625
Grant AF-AFOSR-537-64
Prepared in cooperation with MIT.
Availability: Published in Communications on Pure and Applied Mathematics v19 n4 p353-70 1966.

Descriptors: (* Diffraction, Mathematical analysis), (* Integrals, Asymptotic series), Reflectivity, Scattering, Integration, Mathematics.
Identifiers: Weber functions.

Asymptotic expansions for large values of lambda, uniform in the parameter alpha, of integrals of the type I (lambda;alpha) = Integral between the limits t, r, of g (t)e to the power lambda f (t;alpha)dt are considered. It is shown that I can be expanded uniformly in terms of a Weber function and its derivative, each multiplied by an asymptotic series in 1/lambda. Comparison with the more well known non-uniform results is made. (Author)
AD-655 491 Not available from CFSTI.

THE COMPARISON OF MULTIVARIATE TESTS OF HYPOTHESIS BY MEANS OF BAHADUR EFFICIENCY.
Revised ed.,
Johns Hopkins Univ Baltimore Md
Leon J. Gleser. Jan 66, 19p
AFOSR-67-1624
Contract AF 49 (638)-1302
Revision of manuscript submitted Feb 65.
Availability: Published in Sankhya: The Indian Journal of Statistics v28 pt2/3 SerA p157-74 1966.

Descriptors: (* Statistical tests, * Multivariate analysis), Tests, Sequences, Sampling, Theorems, Probability, Mathematics.
Identifiers: Multivariate tests.

This paper gives a brief discussion of R. R. Bahadur's approximate measure of relative asymptotic performance for sequences of test statistics (Bahadur, 1960). Certain asymptotic results useful in applying this measure of relative efficiency in multivariate statistical theory are derived, and three applications of the Bahadur measure to the comparison of multivariate tests of hypotheses are discussed. The first example compares the likelihood ratio test statistics for the modified * T square problem (Rao, 1946), (Olkin and Shrikhande, 1954) with Hotelling's T square-test statistic and other T square-like test statistics. The second example demonstrates certain new optimal properties of Hotelling's T square-test. The third example compares three test statistics which have been suggested for the problem of testing the equality of dispersion matrices. (Author)
AD-655 527 Not available from CFSTI.

ON THE REDUCTION OF SENSITIVITY IN MULTIVARIATE SYSTEMS,
Michigan Univ Ann Arbor Systems Engineering Lab
For primary bibliographic entry see Field 12B.
AD-655 531 Not available from CFSTI.

STOCHASTIC PROGRAMMING WITH ASPIRATION OR FRACTILE CRITERIA.
California Univ Los Angeles Western Management Science Inst
For primary bibliographic entry see Field 12B.
AD-655 540 Not available from CFSTI.

GREEN'S FUNCTIONS FOR SINGULAR ORDINARY DIFFERENTIAL OPERATORS,
Wisconsin Univ Madison
Fred Brauer. 15 Feb 66, 16p
AROD-5003:4
Contract DA-31-124-ARO (D)-268
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.
Availability: Published in Canadian Journal of Mathematics v19 p571-82 1967.

Descriptors: (* Green's function, * Operators (Mathematics)), Theorems, Hilbert space, Set theory, Boundary value problems, Differential equations, Functions, Matrix algebra, Convergence.

The paper completes the approach to the eigenfunction expansion problem by establishing the properties of the Green's function and its relation to the spectral matrix. The relation between self-adjoint boundary conditions and self-adjoint problems is shown, and an integral expansion of Green's function is established. (Author)
AD-655 548 Not available from CFSTI.

THE SOLUTION OF NON-HOMOGENEOUS SYSTEMS OF DIFFERNTIAL EQUATIONS BY UNDETERMINED COEFFICIENTS,
Wisconsin Univ Madison
Fred Brauer. 21 Feb 66, 10p
AROD-5003:5
Contract DA-31-124-ARO (D)-268
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.
Availability: Published in Canad. Math. Bull v9 n4 p481-7 1966.

Descriptors: (* Differential equations, Linear systems), Exponential functions, Mathematics, Matrix algebra, Theorems.
Identifiers: Eigenvalues.

The solution of a linear non-homogeneous differential equation whose non-homogeneous term is of the form (t to the kth power) (e to the power alpha t) can be obtained by what is usually called the method of undetermined coefficients. The application of this method may be justified in several different ways. We shall consider the analogous problem for a system of differential equations. It turns out that we can solve this problem using only elementary techniques of linear algebra. The solution has essentially the same form as in the case of a single equation, but may contain terms which would not be expected and may lack terms which would be expected in a straight-forward extension of the theory to systems. Our method of obtaining the solution is constructive, in the sense that while our results give only the form of the solution, the solution itself may be found by substitution of this form into the system of differential equations. (Author)
AD-655 549 Not available from CFSTI.

PROPAGATORS IN NONRELATIVISTIC QUANTUM MECHANICS,
New Hampshire Univ Durham
For primary bibliographic entry see Field 20J.
AD-655 553 Not available from CFSTI.

THE EXISTENCE OF INDEMPOTENTS IN CERTAIN OPERATOR ALGEBRAS.
Revised ed.,
Cornell Univ Ithaca N Y
R. H. Farrell. 2 Dec 66, 6p
Contract Nonr-401 (50)
Revision of manuscript submitted 20 Jul 66.
Availability: Published in Duke Math Journal v31 n2 p233-8 Jun 1967.

Descriptors: (* Algebras, * Operators (Mathematics)), Statistical analysis, Groups (Mathematics), Algebraic topology, Theorems, Transformations (Mathematics).
Identifiers: Operator group algebras, Euclidean space.

In statistical problems of constructing tests invariant under the action of a group via the Hunt-Stein theory one considers the group as a group of linear transformations on an L (subscript infinity) space. The usual treatment of the problem constructs an invariant function contained in a certain convex hull, convexity being required in order that certain linear inequalities will be satisfied. The duality of L (subscript infinity) to L (subscript one) is used to obtain compactness, hence existence. Since the statistician is interested only in the existence of an invariant function, consideration has not been given in the literature to the question whether there exist projection operators which are related to the invariant functions obtained. In the sequel we state and prove four results about this question.
AD-655 556 Not available from CFSTI.

ON THE LACK OF A UNIFORMLY CONSISTENT SEQUENCE OF ESTIMATORS OF A DENSITY FUNCTION IN CERTAIN CASES,
Cornell Univ Ithaca N Y
R. H. Farrell. 14 Jul 66, 4p
Contract Nonr-401 (50)
Availability: Published in Annals of Mathematical Statistics v38 n2 p471-4 Apr 1967.

Descriptors: (* Distribution functions, Theorems), Random variables, Sequences, Mathematics, Inequalities, Special functions (Mathematical).
Identifiers: Density functions, Euclidean space.

Let C alpha be the set of distribution functions F on R = (-infinity, infinity) with the following properties: (1) F has a first derivative fF defined and continuous at all points of R, such that sup (subscripts x epsilon R)fF (x) = or < alpha. (2) F has a second derivative defined and continuous at all points of R. Let (delta sub n, n = or > 1) be a sequence of functions such that if n = or > 1 then delta sub n is a real valued Borel measurable function on Rn (Euclidean n-space). Let (X sub n, n = or > 1) be a sequence of independently and identically distributed random variables such that if F is the distribution function of X1 then F epsilon C sub alpha. We let N be a stopping variable relative to (X sub n, n = or > 1) and F, and consider the sequential estimator delta sub n = delta sub n (X1, ..., X sub n) of fF (0). Loss will be measured by square error. Theorem. Suppose that alpha = or > 3 is a real number. If sup (subscripts F epsilon C sub alpha) E sub F, N < infinity, then sup (subscripts F epsilon C sub alpha) R (F, delta) = or > 1/16.
AD-655 557 Not available from CFSTI.

ON THE COEFFICIENTS OF A WIENER CANONICAL EXPANSION FOR THE LIKELIHOOD FUNCTION OF A CONTINUOUS MARTINGALE.
Information Research Associates Inc Lexington Mass
For primary bibliographic entry see Field 9D.
AD-655 594 HC$3.00 MF$0.65

REVISED TABLES FOR ASYMPTOTIC EFFICIENCES OF THE MOMENT ESTIMATORS FOR THE PARAMETERS OF THE WEIBULL LAWS,
Ford Motor Co Dearborn Mich
Satya D. Dubey. 1967, 8p
Availability: Published in Naval Research Logistics Quarterly v14 n2 p261-7 Jun 1967.

Descriptors: (* Statistical analysis, Tables), Special functions (Mathematical), Approximation (Mathematics), Polynomials, Mathematics.
Identifiers: Weibull laws.

Tables 1 to 7, from the work by Dubey, were computed using the eighth degree polynomial approximation of the gamma function gamma (1 + x), 0= or <x= or <1, given by Hastings. The computation was performed to yield values correct to 10 significant digits; nevertheless, it does not appear adequate in the present situation. Clenshaw's formula for the same gamma function, has enabled us to compute the asymptotic efficiencies of the moment estimators of Weibull parameters, correct to 20 significant digits. This formula involves Chebyshev polynomials. These values differ appreciably from those reported by Dubey in quite a few cases and appear accurate for the range of the shape parameter considered there. Consequently, the revised tables are presented here. Entiries of original Tables 4, 5, 6, and portions of other tables compare favorably with the present revised tables.
AD-655 602 Not available from CFSTI.

LINEAR ESTIMATION OF THE LOCATION AND SCALE PARAMETERS FROM TYPE II CENSORED SAMPLES FROM SYMMETRIC UNIMODAL DISTRIBUTIONS,
Packaging Service Corp Wyncote Pa
Lai Kow Chan. 1967, 12p
Research supported in part by National Research Council of Canada.
Availability: Published in Naval Research Logistics Quarterly v14 n2 p135-45 Jun 1967.

Descriptors: (* Functional analysis, Sampling), Distribution functions, Theorems, Taylor's series, Inequalities, Mathematics.
Identifiers: Order statistics, Likelihood.

Estimates of the location and scale parameters, linear in the order statistics of a Type II censored or complete sample, from a continuous symmetric unimodal distribution satisfying certain conditions are obtained. Their coefficients are explicit functions of the expectations of the order statistics or population quantiles from the known parameter-free standardized distribution. Linear estimates with simpler coefficients are also obtained. The theorems state the complete sample case, and the singly and doubly censored cases. The more general case, the multiple censoring, is an extension of these cases and is indicated. All the estimates obtained are asymptotically efficient in the strict sense. (Author)
AD-655 613 Not available from CFSTI.

PART VII. THE NONSYMMETRIC GAME: THE GENERALIZED BEAT-THE-AVERAGE SOLUTION,
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
Richard Levitan, and Martin Shubik. 26 Jun 67, 10p Rept no. Cowles Discussion Paper-227
Contract Nonr-3055 (01)

Descriptors: (* Game theory, Mathematical models), Matrix algebra, Management planning, Mathematical analysis.

In previous papers we have considered an especially violent form of market behavior which in two-person games has been called the 'maximize the difference' solution and in general n-person games the 'beat-the-average' solution. There is a natural extension of beat-the-average to the nonsymmetric case which in terms of interfirm comparison may serve as a benchmark for extreme competition. This solution we call 'maximize the share of industry profits. A closely related problem is discussed which has an interpretation in terms of different levels of cooperation. The solution of the cooperation parameter model gives the necessary computation method for the iteration procedure to calculate the maximum profit share solution. This is done in a computer program written by one of the authors.
AD-655 626 HC$3.00 MF$0.65

THE CHI-SQUARE TEST OF GOODNESS OF FIT FOR A MULTIVARIATE NORMAL DISTRIBUTION.
Technical rept.,
Naval Weapons Lab Dahlgren Va
Carl B. Bates. Jun 67, 21p Rept no. NWL-2104

Descriptors: (* Statistical tests, Multivariate analysis), (* Weapons, Effectiveness), Sampling, Distribution theory, Probability density functions, Matrix algebra, Probability, Tables.

The Pearson Chi-Square Goodness of Fit Criterion for testing the null hypothesis 'The random sample is from a univariate normal parent population' is generalized for multivariate normal distributions to test the null hypothesis 'The random sample of N-dimensional observation vectors is from an N-dimensional multivariate normal parent population.' The basis of the formulation is the distribution of the quadratic form in the exponent of the hypothesized distribution. Application of the procedure is illustrated with a numerical example of experimental data from a weapon effectiveness study. (Author)
AD-655 628 HC$3.00 MF$0.65

MULTIVARIATE OPTIMALITY RESULTS,
Cornell Univ Ithaca N Y Dept of Mathematics
J. Kiefer. 1966, 20p
Contracts Nonr-401 (03), Nonr-401 (50)
Availability: Published in Multivariate Analysis p255-74 1966.

Descriptors: (* Multivariate analysis, Reviews), Optimization, Statistical analysis, Probability, Theorems, Sequences, Measure theory, Mathematics.

This paper gives a survey of optimality results (mainly of admissibility and minimax results) in multivariate analysis.
AD-655 711 Not available from CFSTI.

ON A CLASS OF C* -ALGEBRAS,
California Univ Berkeley Dept of Mathematics
H. O. Cordes. 16 Jul 66, 33p
AFOSR-67-1712
Grant AF-AFOSR-553-64
Availability: Published in Math. Annalen. v170 p283-313 1967.

Descriptors: (* Algebras, * Hilbert space), (* Operators (Mathematics), Integral equations), Functional analysis, Theorems, Mathematics.
Identifiers: Fredholm operators.

A class of C* -algebras, called R-algebras, is considered, having similar properties to the ideal of compact operators in Hilbert-space H. The paper discusses a variety of properties of R-algebras and R-sets too numerous to be listed in details. The intent is to prepare a theory of generalized Fredholm-operators.
AD-655 725 Not available from CFSTI.

COMPUTATIONAL ALGORITHMS IN OPTIMAL CONTROL,
Grumman Aircraft Engineering Corp Bethpage N Y Research Dept
Richard E. Kopp. Mar 67, 16p Rept no. RM-357J
AFOSR-67-1678
Contracts AF 49 (638)-1512, AF 49 (638)-1207
Presented at the 1967 IEEE International Convention, New York, March 20-23, 1967.

Descriptors: (*Optimization, Control), (*Trajectories, Optimization), Numerical analysis, Differential equations, Perturbation theory, Inequalities, Iterative methods, Mathematical analysis, Algorithms.
Identifiers: Optimal control theory.

Concepts fundamental to many numerical optimization techniques are reviewed in order that some of the different methods currently being used can be viewed from a unified approach. The similarities between the ordinary minimum problem and the variational problem are emphasized as is the role that the Lagrange multipliers play in constrained optimization problems. Some of the more recent conjugate gradient methods which appear promising are also discussed. This paper should complement the previous paper by Prof. Bryson in which applications of optimal control are discussed. Any discussion of Dynamic Programming has been deliberately avoided as this is the subject of the last paper on this program by Dr. Larson. (Author)
AD-655 735 HC$3.00 MF$0.65

A HOMOLOGICAL APPROACH TO PARAMETRIC FEYNMAN INTEGRALS,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
J. B. Boyling. May 67, 41p
AFOSR-67-1639
Grant AF-EOAR-36-65

Descriptors: (*Integrals, Quantum mechanics), Bosons, Vector spaces, Perturbation theory, Mathematical analysis.
Identifiers: Feynman integrals.

The methods of homology theory are applied to Feynman integrals in alpha-space. In the case of single-loop graphs the relevant relative homology groups are computed and the results compared with those obtained by k-space methods. For graphs with more than one loop the permanent pinch difficulty is overcome by modifying the ambient manifold and applying Thom's isotopy theorem. Pinching conditions are then found for Landau singularities in which complete circuits are contracted out and for mixed second-type singularities. The breakdown of the hierarchical principle in perturbation theory is also explained from this point of view. (Author)
AD-655 738 HC$3.00 MF$0.65

A 'DISHONEST' APPROACH TO CERTAIN STOCHASTIC EIGENVALUE PROBLEMS.
Revised ed.,
Rensselaer Polytechnic Inst Troy N Y Dept of Mathematics
William E. Boyce. 15 Jun 66, 12p
AFOSR-67-1692
Grant AF-AFOSR-182-64
Revision of manuscript submitted 27 Apr 66.
Availability: Published in SIAM J. Appl. Math., v15 n1 p143-52 Jan 1967.

Descriptors: (*Stochastic processes, Functions), (*Random variables, Differential equations), Operators (Mathematics), Green's function, Integral equations, Perturbation theory, Boundary value problems, Iterations, Numerical analysis.

The statistical properties of eigenvalues of a self-adjoint positive definite boundary value problem are studied by a 'dishonest' method based upon iterating the corresponding integral equation. First and second moments of the lowest eigenvalue are computed, and the results compared with those of an 'honest' perturbation method.
AD-655 741 Not available from CFSTI.

AN EXTENSION OF THE METHOD OF AVERAGING,
Minnesota Univ Minneapolis
P. R. Sethna. 28 Jul 66, 9p
AFOSR-67-1635
Grant AF-AFOSR-704-66
Prepared in cooperation with Brown Univ., Providence, R. I.
Availability: Published in Quarterly of Applied Mathematics, v25 n2 Jul 1967.

Descriptors: (*Differential equations, Theorems), Equations, Matrix algebra, Stability, Periodic variations, Mathematics.

Many problems of technical interest involve weakly nonlinear equations involving both 'fast' and 'slow' time. Yu. A. Mitropolsky has studied such systems and has obtained estimates, valid for finite time, for general solutions, of these systems. This study is concerned with estimates valid for all times but for solutions restricted to almost periodic solutions. The method is applied to a problem of practical interest. (Author)
AD-655 752 Not available from CFSTI.

DYNAMIC PROGRAMMING AND THE HAMILTON-JACOBI METHOD OF CLASSICAL MECHANICS,
Rand Corp Santa Monica Calif
S. E. Dreyfus. Jul 67, 34p Rept no. RM-5116-1-PR
Contract F44620-67-C-0045

Descriptors: (*Dynamic programming, Optimization), Transformations (Mathematics), Boundary value problems, Partial differential equations, Hamiltonian, Numerical methods and procedures.
Identifiers: Hamilton-Jacobi method, Variational theory.

Three methods, using dynamic programming concepts and principles, for analytically solving a variational problem. The conventional dynamic programming method is described and illustrated and two alternatives to the conventional method are developed. While the derivations are new, the results are equivalent to those of the classical Hamilton-Jacobi method of solving optimization problems. (Author)
AD-655 767 HC$3.00 MF$0.65

EIGENELEMENTS OF THE FINITE FOURIER TRANSFORM AND THEIR APPLICATION TO ANTENNA PATTERN SYNTHESIS,
Hughes Aircraft Co Culver City Calif Antenna Dept
For primary bibliographic entry see Field 20N.
AD-655 791 HC$3.00 MF$0.65

ANALYSIS AND SYNTHESIS OF LINEAR MODELS FOR TIME SERIES.
Technical rept.,
Stanford Univ Calif Dept of Statistics
Emanuel Parzen. 18 Apr 66, 53p Rept no. TR-4
Contract Nonr-225 (80)

Descriptors: (*Time series analysis, Mathematical models), Stochastic processes, Random variables, Statistical analysis, Theorems, Optimization, Linear systems, Distribution functions, Matrix algebra.
Identifiers: Likelihood, Density functions.

Contents: Introduction (Four propositions are given concerning time series analysis); Techniques of statistical inference; Linear models for time series; Linear statistical inference; Autoregressive schemes; Relations between time series; Spectral analysis and spectral synthesis of linear models.
AD-655 827 HC$3.00 MF$0.65

THE ESTIMATION OF COHERENCE.
Technical rept.,
Stanford Univ Calif Dept of Statistics
Nigel Nettheim. 16 May 66, 80p Rept no. TR-5
Contract Nonr-225 (80)

Descriptors: (*Transformations (Mathematics), *Multivariate analysis), Random variables, Population (Mathematics), Time-lag theory, Series, Statistical functions, Distribution functions, Integrals, Integral transforms.

Coherence is the frequency domain analog of the classical correlation coefficient. In recent years investigators have become aware that the usual procedure for estimating coherence may often be seriously inadequate; in particular, low estimates have appeared in cases where the true coherence is known to be high. A critical discussion of the usual estimates leads to the proposal of the so-called cross-regressive filter model. In spite of the naturalness of estimates of coherence obtained in this way, they have apparently not been used in the past. In testing whether the proposed model is satisfied one needs to test the hypothesis of identically zero coherence; a natural test is proposed, requiring a knowledge of the mean and variance of the estimated coherence under the null hypothesis.
AD-655 828 HC$3.00 MF$0.65

TIME SERIES ANALYSIS FOR MODELS OF SIGNAL PLUS WHITE NOISE.
Technical rept.,
Stanford Univ Calif Dept of Statistics
Emanuel Parzen. 12 Sep 66, 36p Rept no. TR-6
Contract Nonr-225 (80)
Presented at the International Congress of Mathematicians, Moscow, August, 1966, and at an Advanced Seminar on Spectral Analysis of Time Series, October 3-5, 1966, U. S. Army Mathematics Research Center, Madison, Wisconsin.

Descriptors: (*Multivariate analysis, Functions), (*Signals, *White noise), Spectroscopy, Statistical functions, Integral transforms, Harmonic analysis, Accuracy, Density, Factor analysis, Oscillation.

This paper is concerned with fitting to an observed discrete parameter time series X (.) a model of signal plus white noise. It is shown that there is a basic parameter, representing the signal proportion, to be estimated. Three methods are proposed for estimating the signal proportion, which are named as follows: (1) the cross-bispectral transfer function method, (2) the auto-bispectral transfer function method, (3) the auto-spectral empirical method. A few applications of the model are described.
AD-655 829 HC$3.00 MF$0.65

PROCEEDINGS OF THE CONFERENCE ON THE DESIGN OF EXPERIMENTS IN ARMY RESEARCH, DEVELOPMENT AND TESTING (11th).
Army Research Office, Durham, N. C.
May 66, 628p AROD-66-2

Descriptors: (*Army research, *Symposia), (*Mathematics, Least squares method), Experimental design, Reliability, Mathematical models, Statistical analysis, Decision making, Theory, Statistical data, Statistical analysis, Venoms, Lethal dosage, Numerical methods and procedures, Probability, Monte Carlo method, Physiology, Stress (Physiology), Heart, Factor analysis, Game theory, Medical research, Population (Mathematics), Experimental design, Tables.

Contents: Confidence limits for the reliability of complex systems; Estimation and design for nonlinear models; A problem of deterioration in reliability; Game theory techniques for system analysis and design; Systematic methods for analyzing 2n3m factorial experiments; Construction and comparison of non-orthogonal incomplete factorial designs; Statistical analysis of automatically recorded physiograph data; An application of experimental design in ergonomics; Strategy for the optimal use of weapons by area coverage; Variability of lethal area; Decision procedure for minimizing costs of calabrating liquid rocket engines; The theoretical strength of titanium calculated from the cohesive energy; Ten snake venoms; Piricularia oryzae; Extreme vertices design of mixture experiments; Design of a high-voltage-breakdown-in-vacuum experiment; Model simulation of biocellular systems; Some inferential statistics which are relatively compatible with an individual organism methodology; Control of data-support quality; Designs and analyses for inverse response problems in sensitivity testing; Monte Carlo investigation of the probability distributions of dixon's criteria for testing outlying observations; A simplified technique for estimating degrees of freedom for a two population 'T' test when the standard deviations are unknown and not necessarily equal; Deleting observations from a least squares solution; Precision and bias estimates for data from cinetheodolite and AN/FPS-16 radar trajectory measuring systems; Thermal cycles in welding; Statistical analysis of tensile-strength hardness relationships in thermomechanically treated steels; Some problems in statistical inference for generalized multinomial populations; Statistics in the calibration laboratory; Application of numerical techniques to experimentally model an aerodynamic function; Selecting the population with the largest parameter; Selecting a subset containing the population with t

AD-803 008 HC$3.00

ON THE STABILITY OF A RATE-GYRO UNDER THE INFLUENCE OF FORCED ROTATIONAL MOTIONS OF ITS BASE.

Ueber Die Stabilitaet des Wendekreisels Bei Erzwungenen Drehbewgungen Seines Gestells

Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Oberpfaffenhofen (West Germany). Institut Fuer Steuer- Und Regeltechnik.

G. Schweitzer. Apr 67, 121p DLR-FB-67-30, DVL-637

in German, English Summary

Descriptors: *Differential equation, *Gyroscope, *Motion stability, Analysis, Coefficient, Damping, Differential, Discrete, Drift, Equation, Linearity, Motion, Rate, Stability, Theory, Torque, Variable, Vibration.

For abstract, see STAR 05 17.

N67-30762 HC$3.00 MF$0.65

ESTIMATION IN MIXED FREQUENCY DISTRIBUTIONS.

National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

A. C. Cohen, Jr., and L. W. Falls. Jul 67, 95p NASA-TN-D-4033

Contract NAS8-11175

Descriptors: *Atmospherics, *Frequency distribution, *Statistics, Binomial, Data, Distribution, Estimation, Frequency, Function, Mixture, Model, Poisson distribution, Probability, Weibull distribution.

For abstract, see STAR 05 17.

N67-30766 HC$3.00 MF$0.65

THE CONVERGENCE OF SECTION INVERSES OF SPECIAL INFINITE MATRICES.

Die Konvergenz Der Abschnittsinversen Von Speziellen Unendlichen Matrizen

Eidgenossische Technische Hochschule, Zurich (Switzerland).

P. T. Streckeisen. 1966, 97p DISS-3758

in German

Descriptors: *Convergence, *Fractional replication, *Jacobi matrix method, *Matrix algebra, Algebra, Algorithm, Analysis, Fraction, Function, Infinite, Inversion, Matrix, Method, Repetition, Section.

For abstract, see STAR 05 17.

N67-30897 HC$3.00 MF$0.65

THE GENERALIZATION OF THE BIRKHOFF AEROSPACE REGULARIZATION FOR THE THREE BODIES PROBLEM.

Die Verallgemeinerung Der Birkhoff- Regularisierung Fuer Das Raeumliche Dreikoerperproblem

Eidgenossische Technische Hochschule, Zurich (Switzerland).

J. Waldvogel. 1966, 81p DISS-3816

in German

Descriptors: *Conformal transformation, *Perturbation theory, *Three-body problem, Body, Celestial, Conformal, Differential, Equation, Kepler law, Mechanics, Model, Motion, Perturbation, Problem, Restriction, Space, Spinor, Theory, Three, Transformation.

For abstract, see STAR 05 17.

N67-30899 HC$3.00 MF$0.65

NUMERICAL INTEGRATION OF NONLINEAR DIFFERENTIAL EQUATIONS BY USE OF RATIONAL APPROXIMATION FINAL REPORT, 15 JAN. 1965 - 14 JUL. 1967.

Midwest Research Inst., Kansas City, Mo.

W. Fair, Y. L. Luke, and J. Wimp. 14 Jul 67, 16p NASA-CR-85778

Contract NASR-63/07/

Descriptors: *Approximation method, *Differential equation, *Numerical integration, *Rational function, Approximation, Differential, Equation, Error, Formula, Function, Integration, Method, Nonlinear, Numerical, Rational, Truncation.

For abstract, see STAR 05 17.

N67-31175 HC$3.00 MF$0.65

NEWTON'S METHOD AND THE OPTIMIZATION OF NONLINEAR SYSTEMS.

Texas Univ., Austin. Engineering Mechanics Research Lab.

G. J. Lastman. Jan 67, 23p NASA-CR-85752, EMRL-RM-1016

Grant NSG-551

Descriptors: *Boundary value problem, *Newton-raphson method, *Nonlinear system, *Trajectory optimization, Algorithm, Boundary, Earth, Equation, Mars (planet), Nonlinear, Optimization, Problem, System, Trajectory, Value.

For abstract, see STAR 05 17.

N67-31286 HC$3.00 MF$0.65

ON THE CONTROLLABILITY OF DELAY-DIFFERENTIAL SYSTEMS.

Brown Univ., Providence, R. I. Center for Dynamical Systems.

L. Weiss. Mar 67, 25p NASA-CR-85793, TR-67-3

Contracts NGR-40-002-015, AF-AFOSR-693-66

Descriptors: *Differential equation, *Optimal control, Control, Controllability, Delay, Differential, Equation, Euclidean space, Function, Optimal, System, Time.

For abstract, see STAR 05 17.

N67-31288 HC$3.00 MF$0.65

A NOTE ON CONTACT TRANSFORMATIONS.

Brown Univ., Providence, R. I.

K. R. Meyer. 1967, 7p NASA-CR-85853

Contracts NAS8-11264, NGR-40-002-015

Descriptors: *Partial differential equation, *Vector analysis, Analysis, Contact, Differential, Equation, Function, Linear, Mathematics, Matrix, Partial, Transformation, Vector.

For abstract, see STAR 05 17.

N67-31290 HC$3.00 MF$0.65

LAGRANGE PROBLEMS WITH A VARIABLE ENDPOINT AS OPTIMAL CONTROL PROBLEMS.

North Carolina State Coll., Raleigh.

H. Sagan. Jul 67, 9p NASA-CR-837

Contract NGR-34-002-032

Descriptors: *Lagrange multiplier, *Optimal control, Control, Inequality (math), Maximum, Optimal, Pontryagin principle, Principle, Problem, Trajectory, Weierstrass problem.

For abstract, see STAR 05 17.

N67-31332 HC$3.00 MF$0.65

APPROXIMATION OF POTENTIALS BY THE POTENTIALS OF CLASS C.

Approximation des Potentiels Par les Potentiels de Classe C

Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France).

P. C. Sabatier. May 67, 6p TH/200

in French

Descriptors: *Approximation method, *Physics, *Potential theory, *Problem solving, *Schmidt method, Approximation, Equation, Fourier transform, High energy, Integration, Method, Potential, Problem, Schroedinger equation, Set, Solution, Theory.

For abstract, see STAR 05 17.

N67-31366 HC$3.00 MF$0.65

ENERGY FUNCTIONS FOR MORSE SMALE SYSTEM.

Brown Univ., Providence, R. I.

K. R. Meyer. 1967, 19p NASA-CR-85814

Contracts NAS8-11264, NGR-40-002-015

Descriptors: *Morse potential, *Topology, *Vector space, Approximation, Construction, Dimension, Energy, Field, Function, Gradient, Manifold, Mathematics, Potential, Space, Structure, System, Two, Vector.

For abstract, see STAR 05 17.

N67-31424 HC$3.00 MF$0.65

DYNAMIC PROGRAMMING AND PONTRYAGIN'S MAXIMUM PRINCIPLE.

North Carolina State Coll., Raleigh.

H. Sagan. Jul 67, 21p NASA-CR-838

Contract NGR-34-002-032

Descriptors: *Dynamic programming, *Optimal control, *Pontryagin principle, *Trajectory optimization, Bellman theory, Characteristic, Control, Dynamic, Equation, Function, Optimal, Optimization, Programming, Trajectory.

For abstract, see STAR 05 17.

N67-31480 HC$3.00 MF$0.65

EXTENDED DYNAMICAL SYSTEMS AND STABILITY THEORY.

Brown Univ., Providence, R. I. Center for Dynamical Systems.
J. K. Hale, and E. F. Infante. 1967, 12p NASA-CR-85829
Contracts NAS8-11264, NGR-40-002-015

Descriptors: *Differential equation, *Dynamics, *Operator, *Stability, Banach space, Differential, Equation, Liapunov function, Partial.

For abstract, see STAR 05 17.
N67-31487 HC$3.00 MF$0.65

PERIODIC POINTS OF DIFFEOMORPHISMS.
Brown Univ., Providence, R. I. Center for Dynamical Systems.
K. R. Meyer. 1967, 6p NASA-CR-85854
Contracts NAS8-11264, NGR-40-002-015

Descriptors: *Exponential function, *Fixed point, *Function space, Compactness, Domain, Fixed, Flow, Function, Implicit, Manifold, Mathematics, Orbit, Point, Space, Theorem, Uniform.

For abstract, see STAR 05 17.
N67-31490 HC$3.00 MF$0.65

SPIRAL COORDINATES (DEVELOPED FOR BENDIX G-15A),
Vogt, Ivers, Seaman and Associates, Cincinnatti, Ohio.
Irwin E. Harris. 1967, 11p

Descriptors: (*Curve fitting, Computer programs), Numerical analysis, Mathematics.
Identifiers: Spiral coordinates.

This program computes the coordinates of any point on a spiral and/or the coordinates of any point on a radial line through a point on the spiral.
PB-175 512 HC$3.00 MF$0.65

A STUDY OF LEARNING SYSTEMS OPERATING IN UNKNOWN STATIONARY ENVIRONMENTS.
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
For primary bibliographic entry see Field 9D.
PB-175 515 HC$3.00 MF$0.65

ON THE FINITE STOPPING RULES AND NONPARAMETRIC TECHNIQUES IN A FEATURE-ORDERED SEQUENTIAL RECOGNITION SYSTEM.
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
For primary bibliographic entry see Field 9D.
PB-175 516 HC$3.00 MF$0.65

ON GENERALIZATIONS OF ADAPTIVE ALGORITHMS AND APPLICATION OF THE FUZZY SETS CONCEPT TO PATTERN CLASSIFICATION,
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
For primary bibliographic entry see Field 9D.
PB-175 610 HC$3.00 MF$0.65

12B. Operations Research

A STOCHASTIC DYNAMIC MULTIMODE TRANSPORTATION MODEL,
Rand Corp Santa Monica Calif
J. L. Midler. Jul 67, 39p Rept no. RM-5250-PR
Contract F44620-67-C-0045

Descriptors: (*Transportation, Mathematical models), (*Dynamic programming, Operations research), Stochastic processes, Scheduling, Management planning, Optimization, Algorithms, Costs, Economics.
Identifiers: Optimal control theory.

A mathematical model and two solution techniques for selecting preferred combinations of different transportation modes over consecutive periods in the face of uncertainty. Some acquaintance with control theory, dynamic programming, and nonlinear programming is assumed. The model is formulated as a problem of optimal stochastic control theory. It assigns individual commodity classes to various carriers, determines which supply points serve which destinations, and reroutes carriers where they will be most effective. It takes account of differential transit times and costs, availabilities, costs of storage, over-supply and shortages. The system dynamics consist of inventory balance equations relating end-of-period stocks at each point to inflows and outflows. An alternative method is also presented for cases in which the assumptions required for the dynamic programming algorithm are not valid.
AD-655 344 HC$3.00 MF$0.65

NAVAL RESEARCH LOGISTICS QUARTERLY, VOL. 14, NO. 2, JUNE 1967.
Office of Naval Research Washington D C
For primary bibliographic entry see Field 15E.
AD-655 430 MF$0.65

IMPLICIT ENUMERATION USING AN IMBEDDED LINEAR PROGRAM,
California Univ Los Angeles Western Management Science Inst
Arthur M. Geoffrion. May 67, 22p Rept no. WMSI Working Paper-120
Contract Nonr-233 (75)

Descriptors: (*Linear programming, Inequalities), (*Approximation (Mathematics), Iterations), Operations research, Problem solving, Efficiency, Synthesis, Algorithms, Set theory, Sequences.

Integer programming by implicit enumeration has been the subject of several recent investigations. Computational efficiency seems to depend primarily on the ability of various tests, applied to the constraints in connection with 'partial solutions,' to exclude from further consideration a sufficiently large proportion of the possible solutions. Most of the simpler or more appealing of these tests can be applied at reasonable computational cost essentially to only one constraint at a time. Two main approaches have been suggested for mitigating this limitation.
AD-655 444 HC$3.00 MF$0.65

ON THE REDUCTION OF SENSITIVITY IN MULTIVARIATE SYSTEMS,
Michigan Univ Ann Arbor Systems Engineering Lab
William A. Porter. 14 Jan 67, 12p
AROD-5579:14
Contract DA-31-124-ARO (D)-391
Availability: Published in Int. J. Control v5 n1 p1-9 1967.

Descriptors: (*Systems engineering, Mathematical analysis), Functional analysis, Banach space, Transformations (Mathematics), Hilbert space, Matrix algebra, Theorems, Design.
Identifiers: Multivariate systems.

In an earlier article Cruz and Perkins (1964) presented a generalization of the Bode (1945) sensitivity criterion to multivariate stationary systems. This paper shows that effective design procedures for the multivariate case can be developed from the generalized criteria. (Author)
AD-655 531 Not available from CFSTI.

SIMPLIFICATION OF THE COVERING PROBLEM FOR MULTIPLE OUTPUT LOGICAL NETWORKS.
Ohio State Univ Research Foundation Columbus
For primary bibliographic entry see Field 9B.
AD-655 536 Not available from CFSTI.

STOCHASTIC PROGRAMMING WITH ASPIRATION OR FRACTILE CRITERIA.
Revised ed.,
California Univ Los Angeles Western Management Science Inst
Arthur M. Geoffrion. Dec 66, 13p Rept no. Reprint-43
Revision of manuscript received Aug 1966. Research supported in part by Ford Foundation.
Availability: Published in Management Science v13 n9 p672-9 May 1967.

Descriptors: (*Linear programming, Stochastic processes), (*Quadratic programming, Algorithms), Random variables, Distribution functions, Theorems, Mathematical analysis.

The general linear programming problem is considered in which the coefficients of the objective function to be maximized are assumed to be random variables with a known multinormal distribution. Three deterministic reformulations involve, respectively, maximizing the expected value, the alpha-fractile (alpha fixed, $0 < \text{alpha} < 1/2$), and the probability of exceeding a predetermined level k of payoff. In this paper the author's previous work on 'bi-criterion programs' is specialized to give an algorithm for routinely and efficiently solving the second and third reformulations. A by-product of the calculations in each case is the tradeoff-curve between the criterion being maximized and expected value. The intimate relationships between all three reformulations are illuminated, with the cumulative effect of considerably lessening the burden on the decision-maker to preselect with finality a particular value of alpha or k. (Author)
AD-655 540 Not available from CFSTI.

LABOR AND MACHINE LIMITED PRODUCTION SYSTEMS.
California Univ Los Angeles Western Management Science Inst
For primary bibliographic entry see Field 5A.
AD-655 543 Not available from CFSTI.

OPTIMAL INVESTMENT POLICY: AN EXAMPLE OF A CONTROL PROBLEM IN ECONOMIC THEORY.
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
For primary bibliographic entry see Field 5C.
AD-655 563 Not available from CFSTI.

A QUEUEING SYSTEM WITH MULTIPLE SERVICE TIME DISTRIBUTIONS,
Western Electric Co Inc Princeton N J Engineering Research Center
Carl M. Harris. 1967, 10p
Availability: Published in Naval Research Logistics Quarterly v14 n2 p231-9 Jun 1967.

Descriptors: (*Queueing theory, *Probability), Simultaneous equations, Distribution, Iterations, Convergence, Set theory, Measure theory.

The paper explores a modification of the output discipline for the Poisson input, exponential output, single channel, first-come, first-served queueing system. Instead, the service time distribution of customers beginning service when alone in the system is considered different from that governing service times of all other customers. More specifically, the service times of lone customers are governed by a one parameter gamma distribution, while the service times of all other customers are exponentially distributed.
AD-655 599 Not available from CFSTI.

QUEUES WITH STOCHASTIC SERVICE.
Doctoral thesis,
Western Electric Co Inc Princeton N J Engineering Research Center
Carl M. Harris. Jun 67, 13p
Availability: Published in Naval Research Logistics Quarterly v14 n2 p219-30 Jun 1967.

Descriptors: (*Queueing theory, *Probability), Integral transforms, Distribution functions, Random variables, Measure theory, Theorems, Statistical processes.

The purpose of the paper is to explore an extension of the output discipline for the Poisson input, general output, single channel, first-come, first-served queueing system. The service time parameter, mu, is instead considered a random variable, M. In other words, the service time random variable, T, is to be conditioned by a parameter random variable, M.
AD-655 600 Not available from CFSTI.

SOME CONSTRAINTS ON SHIPPING IN LINEAR PROGRAMMING MODELS,
Research Analysis Corp Mclean Va
For primary bibliographic entry see Field 15E.
AD-655 601 Not available from CFSTI.

A TWO-STATION STOCHASTIC INVENTORY MODEL WITH EXACT METHODS OF COMPUTING OPTIMAL POLICIES,
Wisconsin Univ Madison
For primary bibliographic entry see Field 15E.
AD-655 611 Not available from CFSTI.

INVENTORY CONTROL OF A MULTIPRODUCT SYSTEM WITH A LIMITED PRODUCTION RESOURCE,
California Univ Los Angeles Western Management Science Inst
Richard V. Evans. 1967, 13p
Contract Nonr-233 (73)
Availability: Published in Naval Research Logistics Quarterly v14 n2 p173-84 Jun 1967.

Descriptors: (*Inventory control, Mathematical models), (*Scheduling, Management planning), (*Operations research, Optimization), Dynamics, Dynamic programming, Distribution functions, Mathematical analysis.

Optimal control of the production of several products subject to restricted production resources is considered. Linear production, holding and penalty costs are assumed although this is crucial only for production costs. Excess demand results in lost sales. A single point plays an important role in the definition of the optimal policy. (Author)
AD-655 612 Not available from CFSTI.

PART VII. THE NONSYMMETRIC GAME: THE GENERALIZED BEAT-THE-AVERAGE SOLUTION,
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
For primary bibliographic entry see Field 12A.
AD-655 626 HC$3.00 MF$0.65

MAXIMIZING STATIONARY UTILITY IN A CONSTANT TECHNOLOGY,
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
Richard Beals, and Tjalling C. Koopmans. 14 Jul 67, 23p Rept no. Cowles Discussion Paper-229
Contract Nonr-3055 (01)
Prepared in cooperation with Chicago Univ., Ill. Prepared for presentation at the International Symposium on Mathematical Programming, Princeton, N. J., August 1967.

Descriptors: (*Optimization, Control), (*Mathematical programming, *Management planning), Stochastic processes, Economics, Operations research, Theorems, Mathematical analysis.
Identifiers: Utility functions.

This paper is concerned with a problem in the optimal control of a nonstochastic process over time. It can also be looked on as a problem in convex programming in a space of infinite sequences of real numbers. The literature on optimal economic growth contains several papers in which a utility function of the form (1) U (x1,x2,...)= Summation, t=1 to t=infinity, of alpha (superscript (t-1)) u (x sub t), O<alpha<1, is maximized under given conditions of technology and population growth. Here xt is per capita consumption in period t, and u (x) is a strictly concave, increasing, single-period utility function. Alpha is called a discount factor. A generalization of (1) has been proposed under the name stationary utility, and is definable by a recursive relation (2) U (x1, x2, x3,...) = V (x1, U (x2, x3,...)). One obtains (1) by V (x, U)= u (x)+alpha U. The natural generalization of alpha in (1) to stationary utility is the function (2a) alpha (x) = (the partial derivative of V (x,U) with respect to U) subscript U = U (x,x,x,...). In this paper we study the maximization of (2) under production assumptions.
AD-655 627 HC$3.00 MF$0.65

MULTIVARIATE LOGARITHMIC AND EXPONENTIAL REGRESSION MODELS,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 14A.
AD-655 768 HC$3.00 MF$0.65

GERT - GRAPHICAL EVALUATION AND REVIEW TECHNIQUE.
Rand Corp., Santa Monica, Calif.
A. A. Pritsker. Apr 66, 160p NASA-CR-74140, RM-4073-NASA
Contract NASR-21

Descriptors: *Network analysis, *Stochastic process, Analysis, Elasticity, Evaluation, Flow, Graph, Integration, Loop, Network, Node, Parallel, Process, Review, Sensitivity, Series, Stochastic, Technique.

For abstract, see STAR 05 17.
N67-31354 HC$3.00 MF$0.65

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

GAS TURBINE EJECTOR,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21E.
AD-655 350 HC$3.00 MF$0.65

A REPETITIVE MECHANICAL PHOTOFLASH TIMER FOR THE MILLISECOND REGION,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 14E.
AD-655 421 HC$3.00 MF$0.65

13B. Civil Engineering

PILOT STUDY OF RIVER FREQUENCY.
Technical rept.,
Detroit Univ Mich Dept of Civil Engineering
D. M. Lassaline, W. J. Baker, D. A. Sloss, Jr., and C. X. C. F. Miranda. Mar 67, 35p
ATAC-TR-9647, LL-114
Contract DA-20-113-AMC-09099 (T)

Descriptors: (*Rivers, *Soil mechanics), (*Tanks (Combat vehicles), Environmental tests), Trafficability, Feasibility studies, Michigan, Ohio, Vehicles, Mobility, Depth indicators, Frequency, Plants (Botany), Terrain, Experimental data, Collecting methods.

A series of cross-country traverses were taken in Michigan and southeastern Ohio to determine the feasibility of conducting cross-country surveys to collect data on the frequency of various type streams. The technique of making a cross-country survey to collect environmental data has been demonstrated. The survey showed that deep water was rarely encountered and that bank negotiation may be the main obstacle to vehicle mobility in the stream environment.
AD-655 269 HC$3.00 MF$0.65

PROPOSAL FOR A 'SMOG TAX',
Rand Corp Santa Monica Calif
D. M. Fort, W. A. Niskanen, A. H. Pascal, and W. F. Sharpe. 25 Feb 59, 29p Rept no. P-1621-RC

Descriptors: (*Air pollution, *Cost effectiveness), (*Vehicles, California), Smokes, Fog, Motor vehicle operators, Exhaust gases, Exhaust systems, Traffic, Waste gases, Wastes (Industrial).

The Smog Tax is designed to give the individual the widest possible latitude in choosing those anti-smog actions most appropriate to his personal circumstances. It affords the fairest possible treatment of individuals in different circumstances, with different types of cars, different transportation needs, different driving habits, and different viewpoints. Each individual is penalized according to his output of pollutants. In a program aimed at the significant reduction of air pollutant output, this formula, is as fair and effective as any that can be derived.
AD-655 338 HC$3.00 MF$0.65

13C. Construction Equipment Materials, and Supplies

DRAINAGE CHARACTERISTICS OF BASE COURSE MATERIALS LABORATORY INVESTIGATION.
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 8M.
AD-655 505 MF$0.65

TIME-COMPRESSION POTENTIAL OF AN EMERGENCY BLAST SHELTER PROGRAM.
Hudson Inst Inc Harmon-on-Hudson N Y
For primary bibliographic entry see Field 13M.
AD-655 519 HC$3.00 MF$0.65

13D. Containers and Packaging

DESIGN OF CUSHIONING SYSTEMS FOR AIRDROP.
Technical rept.,
Army Natick Labs Mass Airdrop Engineering Div
Maurice P. Gionfriddo. Feb 67, 36p
USA-NLABS-TR-67-59-AD

Descriptors: (*Shock absorbers, Design), (*Packing materials, Design), (*Expanded plastics, Shock absorbers), (*Honeycomb cores, Shock absorbers), Air drop operations, Drop testing, Landing impact, Impact shock, Paper, Metals, Foams, Flexible structures, Energy.
Identifiers: Cushioning materials.

Complementary analytical and empirical techniques for the design of energy dissipater config-

urations for air dropped items are presented. The techniques are applicable to the use of single-shot, sheet-type energy dissipater materials which have an essentially rectangular stress-strain curve for the greatest part of their deformation, such as paper honeycomb, metal honeycombs, and certain foamed plastics. (Author)
AD-655 280 HC$3.00 MF$0.65

PACKAGING DENSITY STUDY: ANALYSIS AND METHODS FOR 'BALL PARK' ESTIMATES OF PACKAGING EFFICIENCY,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
F. V. Burke. 20 Sep 57, 25p Rept no. CF-2682
Contract NOrd-7386

Descriptors: (*Packaging, *Electronic equipment), Volume, Density, Efficiency, Radio receivers, Amplifiers, Automatic pilots, Guided missiles.

The memorandum presents data pertinent to packaging efficiency and density, represented by three missile electronic packaging techniques. A transistorized receiver, consisting of an average population of conventional components from one type of missile, is compared to a vacuum tube system also consisting of generally conventional hardware from another missile. Both are compared to a third missile design involving packaging where water cooling is required. The subassemblies are examined and compared on the following points. (1) Number and types of components, (2) Volume of unit, and (3) Surface area density (Population). The components of each subassembly are itemized for comparison and are converted into a standard evaluation unit which allows population density comparisons to be made. By applying a similar technique to any 'average' schematic, a comparison of data will predict the minimum size, volume and density that can be constructed. The packages are compared on the basis of tube density, weight density and heat concentration. (Author)
AD-655 417 HC$3.00 MF$0.65

AN EMPIRICAL STUDY OF ELF AND VLF SHIELD CANS,
Navy Underwater Sound Lab New London Conn
For primary bibliographic entry see Field 9A.
AD-655 644 HC$3.00 MF$0.65

HANDBOOK OF DESIGN CRITERIA FOR MICROELECTRONIC SYSTEM PACKAGES. VOLUME I. PACKAGING SYSTEM METHODOLOGY. VOLUME II. PACKAGING SYSTEM DESIGN AND EVALUATION PROCEDURE.
Hughes Aircraft Co Fullerton Calif
For primary bibliographic entry see Field 9E.
AD-655 762 HC$3.00 MF$0.65

HANDBOOK OF DESIGN CRITERIA FOR MICROELECTRONIC SYSTEM PACKAGES. VOLUME IIIA. DESIGN DATA.
Hughes Aircraft Co Fullerton Calif
For primary bibliographic entry see Field 9E.
AD-655 763 HC$3.00 MF$0.65

HANDBOOK OF DESIGN CRITERIA FOR MICROELECTRONIC SYSTEM PACKAGES. VOLUME IIIB. DESIGN DATA.
Hughes Aircraft Co Fullerton Calif
For primary bibliographic entry see Field 9E.
AD-655 764 HC$3.00 MF$0.65

HANDBOOK OF DESIGN CRITERIA FOR MICROELECTRONIC SYSTEM PACKAGES. VOLUME IV. DESIGN EXAMPLE.
Hughes Aircraft Co El Segundo Calif
For primary bibliographic entry see Field 9E.
AD-655 765 HC$3.00 MF$0.65

13E. Couplings, Fittings, Fasteners, and Joints

EVALUATION OF BACB30BG AND BACB30BH BOLTS.
Boeing Co., Seattle, Wash. Launch Systems Branch.
J. F. Hart. 30 Dec 66, 15p NASA-CR-84854, T5-6539-83
Contract NAS8-5608

Descriptors: *Bolt, *Saturn s- ic stage, Double, Qualification, Shear, Specification, Tensile, Test.

For abstract, see STAR 05 17.
N67-31211 HC$3.00 MF$0.65

13F. Ground Transportation Equipment

STUDY OF A PLANNING-PROGRAMMING-BUDGETING SYSTEM FOR TRANSPORTATION. VOLUME I. SYNOPSIS.
Planning Research Corp Los Angeles Calif
For primary bibliographic entry see Field 5A.
AD-655 187 HC$3.00 MF$0.65

STUDY OF A PLANNING-PROGRAMMING-BUDGETING SYSTEM FOR TRANSPORTATION. VOLUME II. PPB SYSTEM METHODOLOGY.
Planning Research Corp Los Angeles Calif
For primary bibliographic entry see Field 5A.
AD-655 188 HC$3.00 MF$0.65

STUDY OF A PLANNING-PROGRAMMING-BUDGETING SYSTEM FOR TRANSPORTATION. VOLUME III. EXERCISING THE P P B SYSTEM.
Planning Research Corp Los Angeles Calif
For primary bibliographic entry see Field 5A.
AD-655 189 HC$3.00 MF$0.65

PILOT STUDY OF RIVER FREQUENCY.
Detroit Univ Mich Dept of Civil Engineering
For primary bibliographic entry see Field 13B.
AD-655 269 HC$3.00 MF$0.65

PROPOSAL FOR A 'SMOG TAX',
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 13B.
AD-655 338 HC$3.00 MF$0.65

HIGH-SPEED ABRASION OF TEXTILE CORDAGE ON AN ASPHALT SURFACE.
Royal Aircraft Establishment Farnborough (England)
For primary bibliographic entry see Field 11E.
AD-655 484 HC$3.00 MF$0.65

U.S. PASSENGER TRANSPORTATION: AN INVENTORY OF RESOURCES AND AN ANALYSIS OF CAPABILITIES OF SURFACE MODES.
Final rept.,
Stanford Research Inst Menlo Park Calif
Howard R. Ross. Mar 67, 96p
Contract OCD-PS-64-201

Descriptors: (*Transportation, *Inventory), (*Passenger vehicles, *Roads), Railroads, Traffic, Urban areas, Pavements, Nuclear weapons, Blast, Radioactive fallout, Shielding.

The report presents the results of a study of U. S. passenger transportation by surface modes, consisting essentially of an inventory of resources and an analysis of capabilities. The modes considered include the private automobile; intercity, city, and nonrevenue buses; and passenger trains, commuter rail, and rail rapid transit. The principal elements of each of these are identified as facilities and vehicles. These resources are inventoried in gross summary form and located in terms of large geographical units. A general analysis of these resources is made in terms of their capabilities to handle passengers under normal and emergency conditions, and such capabilities are compared by mode. Where available, data based on actual observations of passenger capacities are shown. For a specific area of limited geographical extent, a sample analysis of the combined passenger capacities of various modes is presented.
AD-655 567 HC$3.00 MF$0.65

DEVELOPMENT OF ELECTRICALLY POWERED VEHICLES.
Federal Power Commission, Washington, D. C. Bureau of Power.
Feb 67, 53p
Prepared in cooperation with Committee on Commerce, U. S. Senate.

Descriptors: (*Passenger vehicles, *Storage batteries), Power, Energy, Contamination, Economics, Air, Waste gases, Law, Performance (Engineering), Commerce, Lead, Nickel, Electrodes, Cadmium, Silver, Zinc, Maintenance, Tables.

Contents: History of electric vehicles; Present status of battery-powered vehicles; Electric energy storage systems; Electric vehicles; Public acceptance of the short-range electric vehicle; Electric power requirements; The electric vehicle and air pollution; Electric vehicle legislation. (Author)
PB-174 982 HC$3.00 MF$0.65

13G. Hydraulic and Pneumatic Equipment

NON-LINEAR WAVE EFFECTS ON TIDE GAGES.
California Univ Berkeley Hydraulic Engineering Lab
For primary bibliographic entry see Field 8C.
AD-655 255 HC$3.00 MF$0.65

STRENGTH AND DYNAMICS OF AVIATION MOTORS: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21E.
AD-655 382 HC$3.00 MF$0.65

13H. Industrial Processes

BEHAVIOR OF BEACH FILL AND BORROW AREA AT SHERWOOD ISLAND STATE PARK WESTPORT, CONNECTICUT.
Army Coastal Engineering Research Center Washington D C
For primary bibliographic entry see Field 15E.
AD-655 260 HC$3.00 MF$0.65

SOLIDIFICATION AND SEGREGATION IN WELDING OF BINARY ALLOYS.
Technical rept.,
Army Materials Research Agency Watertown Mass
Warren C. Malatesta, and Donald C. Buffum. Jun 67, 20p Rept no. AMRA-TR-67-19

Descriptors: (*Welding, *Alloys), (*Metallurgy, Alloys), Metallography, Solid solutions, Arc welding, Diffusion, Crystallization, Microstructure, Nucleation, Grain structures (Metallurgy).

The report concerns the initial effort of a long-range program designed to determine the effects

that welding variables and base metal chemistry have upon the solidification mode of weld metals. To minimize the complexity of the problem, two relatively pure binary alloys having high solid solubility were selected as parent materials. Weld metals were produced in these parent materials, using a stationary inert-gas shielded tungsten arc and a constant current welding mode. Energy inputs were regulated by controlling arc operation time. Efforts were made to limit heat flow so that experimental procedures would develop constant and reproducible results. Thus far in the program, studies have been limited to metallographic and electron beam microanalysis of the base and weld metal microconstituents. The effects of energy input have been studied and some effects that base metal chemistry has on the growth mode of a solid interface have been observed. Information on the segregation effect in the base metal structures and substructures of the columnar weld metal grains are reported. Photomicrographs showing the growth mode and chemical segregation effect in high and low energy input weld metals are presented. Data developed from the electron beam microprobe analysis are tabulated and correlated with the physical appearance of weld metal growth products. The metallographic study shows that the growth mode of the solid interface at the fusion line is essentially 100 percent epitaxial in nature. Electron beam microprobe analysis shows that chemical micro-segregation in the weld metal growth structures is small, and similar to that in the parent metal. (Author)
AD-655 262 HC$3.00 MF$0.65

WELDING OF NONFERROUS METALS AND THEIR ALLOYS, CHAPTER IX AND X,
Foreign Technology Div Wright-Patterson AFB Ohio
Ya. L. Klyachkin. 24 Apr 67, 62p Rept no. FTD-MT-65-272
TT-67-62352
Edited machine trans. of mono. Svarka Tsvetnykh Metallov i ikh Splavov, Moscow, 1964 p284-325.

Descriptors: (*Welding, Handbooks), (*Corrosion-resistant alloys, Welding), (*Refractory metal alloys, Welding), (*Refractory metals, Welding), USSR, Copper, Brass, Bronze, Nickel alloys, Lead, Copper alloys, Aluminum alloys, Steel, Electron beam welding, Ultrasonic welding.

The book considers the theory of welding nonferrous metals, the basic engineering processes (including light refractory metals), the welding regimes, the composition of fluxes, coatings, and filler wire. There is a brief description of special equipment for welding nonferrous metals. Data are included on the corrosion resistance and mechanical strength of weldments.
AD-655 361 HC$3.00 MF$0.65

A COMPUTER SIMULATION EXPERIMENT OF SUPERVISORY CONTROL OF REMOTE MANIPULATION.
Masssachusetts Inst of Tech Cambridge Engineering Projects Lab
For primary bibliographic entry see Field 5H.
AD-655 375 HC$3.00 MF$0.65

QUARTERLY REPORT OF TECHNICAL PROGRESS, NO. 8,
Martin Co Denver Colo Center for High Energy Forming
Gaylen A. Thurston. 1 Jul 67, 13p
AMRA-CR-66-05/9
Contract DA-19-066-AMC-266 (X)

Descriptors: (*High energy rate forming, Industrial research), Dies, Strain (Mechanics), Hardening, Explosive forming.

A parametric study was initiated using the computer program to predict strains in blanks formed into ellipsoidal dies. Techniques and instrumentation for dynamic strain measurements have been checked out. Brief descriptions of papers on shock hardening, high-strain-rate ductility, explosive welding, and strain-rate experiments that were presented at the First International Conference of the Center for High Energy Forming are in this report. Papers presented by representatives of the Center at the conference will be included in the Second Annual Report of the Center. The complete proceedings of the conference will be edited and published at a later date. (Author)
AD-655 521 HC$3.00 MF$0.65

SURVEY OF DEFORMATION PROCESSES AND DEFORMATION CHARACTERISTICS OF DIFFICULT TO FORM METALS.
Final technical rept. 10 Feb 66-10 Jun 67,
Battelle Memorial Inst Columbus Ohio Columbus Labs
F. W. Boulger, A. F. Gerds, R. L. Jentgen, G. E. Meyer, and H. Ll. D. Pugh. 10 Jun 67, 331p
Contract NOw-66-0214

Descriptors: (*Metals, *Deformation), (*Material forming, Deformation), Fracture (Mechanics), Brittleness, Plasticity, Lubrication, Stresses, Ductility.

The report covers the following subjects: ductile fracture; application of high pressure to the forming of brittle metals; superplasticity; lubrication in metal-deformation processes; swaging; adiabatic conditions in deformation processing; residual stresses produced by deformation.
AD-655 623 HC$3.00 MF$0.65

A BIBLIOGRAPHY OF LASER APPLICATIONS.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 20E.
AD-655 774 HC$3.00 MF$0.65

RELIABILITY TEST PROGRAM OF ULTRASONIC FACE DOWN BONDING TECHNIQUE.
Final rept., 10 Nov 65-31 Jan 67,
Sperry Rand Corp Philadelphia Pa UNIVAC Div
Robert P. Moore. Jun 67, 94p
RADC-TR-67-138
Contract AF 30 (602)-3921)

Descriptors: (*Ultrasonic welding, *Integrated circuits), Circuit interconnections, Bonding, Substrates, Reliability.

A study was made to determine the overall reliability of its face-down-bonding process and to determine whether the bonding process damages the chip. The ultrasonic direct-bonding process was used to fabricate approximately 900 test samples for this study. Samples were subjected to the following tests: shear, mechanical shock, thermal shock, vibration, centrifuge, high-temperature storage, elevated-temperature back bias, step stress and comparison, and temperature and humidity. Defective units were examined for causes of failure. The test results indicate that the stresses applied during bonding do not affect circuit operation. The bond failure rate was high, but the distribution of failures suggests thet this was due to inadequate substrate process control rather than inherent problems with face-down bonding. The substrate interconnect wires corroded in high-temperature and high-humidity ambients. Several potential solutions to this problem are suggested. (Author)
AD-655 781 HC$3.00 MF$0.65

FUNDAMENTALS OF ELECTROPLATING, PART II.
Israel Program for Scientific Translations, Ltd., Jerusalem.
N. T. Kudryavtsev, and V. I. Lainer. 1966, 537p
TT-65-50003, PT. II
Transl. Into English From Metallurgizdat. - Gos. Nauchn. Tekhn. Izd. Lit. Po Chernoii Tsvetn. Met. (Moscow), 1957

Descriptors: *Coating, *Electrodeposition, *Electroplating, Alloy, Aluminum, Cobalt, Color, Electric, Equipment, Indium, Installation, Iron, Oxide, Phosphate, Plating, Shop, Testing, Ventilation, Zinc.

For abstract, see STAR 05 17.
N67-30933 HC$3.00 MF$0.65

COAL PROCESSING BY ELECTROFLUIDICS, PHASE II.
Iowa State Univ. of Science and Tech., Ames.
For primary bibliographic entry see Field 7A.
PB-174 927 HC$3.00 MF$0.65

METAL-WORKING INDUSTRY TRAINING MANUAL.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
For primary bibliographic entry see Field 5I.
PB-175 521 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A BRASS FOUNDRY.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 524 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF MINERAL WOOL.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 525 HC$3.00 MF$0.65

SMALL BRASS FOUNDRY.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 532 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF SOUVENIRS AND SAMLL JEWELRY.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 540 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A JOB MACHINE SHOP.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 541 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A WOOL SCOURING PLANT.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-175 543 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF PAINT AND VARNISH BRUSHES.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 546 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A PLANT FOR PLATING OF AUTOMOBILE PARTS.

International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 547 HC$3.00 MF$0.65

HAND-MADE BLOWN GLASS AND FINE CAST CRYSTAL.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
For primary bibliographic entry see Field 5C.
PB-175 549 HC$3.00 MF$0.65

13I. Machinery and Tools

DESIGN OF THE ADAPTIVE FEEDBACK LOOP IN PARAMETER - PERTURBATION ADAPTIVE CONTROLS.
Technical rept.,
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
R. E. Kronauer, and P. G. Drew. 1966, 14p Rept no. TR-521
Contract Nonr-1866 (16)
Presented in cooperation with Little (Arthur D.), Inc., Cambridge, Mass.
Availability: Published in Theory of Self-Adaptive Control Systems (Plenum Press p299-308 1966).

Descriptors: (*Adaptive control systems, Feedback), Perturbation theory, Servomechanisms, Design, Mathematical analysis.

Prior analyses of parameter-perturbation adaptive control systems have demonstrated that the idea will work, but have not investigated the design of the adaptive loop. They require that the perturbations be small and slow and that the adaptive feedback be slow, but do not address quantitatively the questions of how small is small enough and how slow is slow enough. These are the questions dealt with in this paper. (Author)
AD-655 555 Not available from CFSTI.

RESPONSE CHARACTERISTICS OF A SAVONIUS ROTOR CURRENT METER.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 9C.
AD-655 641 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF PAINT AND VARNISH BRUSHES.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5C.
PB-175 546 HC$3.00 MF$0.65

13J. Marine Engineering

AN ECONOMIC ANALYSIS OF US NAVAL SHIPBUILDING COSTS,
Institute for Defense Analyses Arlington Va Economic and Political Studies Div
Harry Williams, John D. Wells, Elizabeth R. Johnston, and Edward G. Sanders. Dec 66, 150p Rept no. R-120
IDA/HQ-67-5801
Contract SD-50

Descriptors: (*Ships, Costs), Naval vessels (Combatant), Naval vessels (Support), Economics, Analysis, Construction, Naval procurement, Shipyards.

The report examines the investment cost of US naval ships in order to determine whether alternative procurement practices might lead to reduced costs. The analysis was limited to privately owned shipyards in the United States and other selected countries and was only concerned with that portion of the work carried out in the shipyard (i.e., it did not consider Government-furnished equipment). The report identifies three ways in which the procurement cost of US naval ships could be reduced. First, research indicated that between 1951 and 1965 the US Navy could have aggregated its ship purchasing so as to realize fully those cost reductions typically associated with volume procurement. Second, the US naval shipbuilding industry could have exhibited more efficiency than it did given US factor costs. Third, the US Navy could purchase ships from selected foreign shipbuilders at reduced cost. (Author)
AD-655 233 HC$3.00 MF$0.65

STATE OF THE ART SURVEY OF CARGO HANDLING SYSTEMS FOR GENERAL CARGO: FAST DEPLOYMENT LOGISTIC SHIP PROJECT.
Department of the Navy Washington D C
For primary bibliographic entry see Field 15E.
AD-655 242 MF$0.65

LINEARIZED THEORY OF A PARTIALLY CAVITATING PLANO-CONVEX HYDROFOIL INCLUDING THE EFFECTS OF CAMBER AND THICKNESS,
California Inst of Tech Pasadena Hydrodynamics Lab
R. B. Wade. 23 Nov 65, 8p
Contract Nonr-220 (24)
Availability: Published in Journal of Ship Research v11 n1 p20-7 Mar 1967.

Descriptors: (*Hydrofoils, *Cavitation), Camber, Thickness, Linear systems, Two-dimensional flow, Incompressible flow.

The linearized treatment of the flow over a partially cavitating single hydrofoil having a flat pressure surface and a circular-arc suction side is presented. The flow is treated as a two-dimensional, steady, inviscid flow. Further assumptions made are those of incompressibility and irrotationality. The results obtained are compared with experiment and generally good correlation is found for the ranges of validity of the linearization. (Author)
AD-655 318 Not available from CFSTI.

EXPERIMENTAL DATA OF GAMMA-RAY PENETRATION INTO THE COMPARTMENTS OF A LIGHT AIRCRAFT CARRIER.
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 18F.
AD-655 426 HC$3.00 MF$0.65

PERFORMANCE AND CORRELATION STUDIES OF THE BUSHIPS PARENT HYDROFOIL AT SPEEDS FROM 40 TO 75 KNOTS.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
Peter K. Spangler. Dec 66, 68p
DTMB-2353

Descriptors: (*Hydrofoils, Cavitation), Lift, Drag, Angle of attack, Vibration, Model tests.
Identifiers: Supercavitating hydrofoils.

The hydrofoil was tested through a 1.44 to 12.44 deg range of angle of attack and depths of immersion of 0.5, 1.0, and 1.5 chords. Lift and drag measurements were made and cavitating flow conditions were determined from high speed photographs. The order of transition of cavitation with increasing speed was: base cavitation, partial upper surface cavitation, ventilation, and supercavitation. Abrupt transitions and overlapping of cavitation regions occurred. Lift coefficients were constant with base cavitation and complete ventilation. At low angles of attack, lift increased with decreasing draft. The hydrofoil vibrated during 65 percent of the tests. In the lowest frequency mode a relationship existed between speed and cycle length, independent of angle of attack, depth, and cavitation. (Author)
AD-655 433 HC$3.00 MF$0.65

MODEL TEST DETERMINATION OF SEA LOADS ON CATAMARAN CROSS STRUCTURE.
Research and development rept.,
Naval Ship Research and Development Center Washington D C Structural Mechanics Lab
Alfred L. Dinsenbacher, John N. Andrews, and Daniel S. Pincus. May 67, 78p
NSRDC-2378

Descriptors: (*Catamarans, Loading (Mechanics)), Ship hulls, Model tests, Determination, Ship structural components, Design, Ocean waves, Response.

To obtain design loads for the cross structure joining the hulls of a catamaran, a model was instrumented and tested in random waves. Response amplitude operators (RAO's) were obtained from the test data by means of spectral analysis. Then the RAO's were used in conjunction with theoretical Neumann sea spectra to predict loads for sea states higher than those obtained experimentally. Analysis of the results led to the conclusion that (1) as for vertical shear and moment loads on the cross structure, the most severe operating condition was with the ship operating at zero speed in beam seas; (2) the most severe torsional loads occurred with the ship operating at zero speed in quarter-head seas; and (3) since the measured responses agreed well with the predicted loads, support was lent to extrapolation of these loads to higher sea states. (Author)
AD-655 441 HC$3.00 MF$0.65

DEVELOPMENT OF AN OCEAN DATA STATION TELEMETERING BUOY.
General Dynamics/Convair San Diego Calif
For primary bibliographic entry see Field 8C.
AD-655 618 HC$3.00 MF$0.65

THRUST AND BLADE SPINDLE TORQUE MEASUREMENT OF FIVE CONTROLLABLE-PITCH PROPELLER DESIGNS FOR MSO 421.
Research and development rept.,
Naval Ship Research and Development Center Washington D C Hydromechanics Lab
E. Orm Hansen. Apr 67, 71p
NSRDC-2325

Descriptors: (*Minesweepers, Propellers (Marine)), (*Propellers (Marine), Torque), Thrust, Propeller blades, Measurement, Design, Leading edge, Graphics.
Identifiers: MSO 421.

An experimental study is presented of the blade spindle torque of five controllable-pitch propeller models, representing five different designs for MSO-421. The study covers a range of both positive and negative advance coefficients at both ahead and astern pitch settings. It was found that the blade with spindle axis located 40 percent of blade width from the leading edge and with uncambered National Advisory Council for Aeronautics Series 66 (NACA 66) airfoil blade sections modified by the Bureau of Ships required the least extreme value of spindle torque. (Author)
AD-655 636 HC$3.00 MF$0.65

STUDY OF HULL MECHANICAL/ELECTRICAL INSTALLED EQUIPMENT STANDARDIZATION FOR COMMISSIONED SHIPS.
Final rept.
Logistics Management Inst Washington D C
Jul 67, 103p
Contract SD-271

Descriptors: (*Ship hulls, Maintenance), (*Spare parts, Standardization), Ships, Naval vessels (Combatant), Electrical equipment, Management engineering, Feasibility studies.

The report is in two parts. Part A deals primarily with installed C/E standardization within classes of 'in-service' ships. Part B examines explicitly the rotatable pool concept (pools of selected components and equipments) and probes, in some detail, the interfaces between a rotatable pool program and a standardization program. (Author)
AD-655 816 HC$3.00 MF$0.65

OCEANOGRAPHIC EFFECTS ON PLASTIC ENGINEERING MATERIALS,
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
For primary bibliographic entry see Field 11I.
AD-655 817 HC$3.00 MF$0.65

COLLATION OF POWER PLANT STUDIES.
Final rept.,
IIT Research Inst., Chicago, Ill.
Alexander Goldsmith. 15 Feb 67, 126p
Contract MA-3974

Descriptors: (*Marine surface propulsion, *Merchant vessels), Design, Diesel engines, Gas turbines, Steam turbines, Auxiliary power plants, Steam power plants, Boilers, Marine engines, Marine engineering, Electric power production, Costs, Economics.

The report is a summary of five major studies that dealt with the design of economical integrated power plants for the propulsion of future American merchant ships. Brief descriptions are given of two steam plants, two gas-turbine plants, and one diesel plant, and of their respective auxiliary systems. Economic factors pertaining to these power plants are compared on a common basis with respect to estimated initial costs and operating costs. The results indicate that a proposed diesel plant has an economic advantage over the other proposed systems. (Author)
PB-175 612 HC$3.00 MF$0.65

13K. Pumps, Filters, Pipes, Fittings, Tubing, and Valves

WORKING LIQUID FOR VACUUM PUMPS,
Foreign Technology Div Wright-Patterson AFB Ohio
E. N. Martinson, B. I. Plechev, and K. N. Myznikov. 27 Feb 67, 5p Rept no. FTD-HT-67-16
Unedited rough draft trans. of Patent (USSR) 168 840, appl. no. 865325/24-6 13 Nov 63.

Descriptors: (*Vacuum pumps, Liquids), USSR, Patents, Hydrates, Controlled atmospheres, Lubrication, Cryogenics.

The article describes the use of cryohydrates as the working liquid for vacuum pumps, for example mechanical and vapor-jet pumps, for the purpose of pumping out of vacuums free of hydrocarbons.
AD-655 351 HC$3.00 MF$0.65

VACUUM PUMPING UNIT,
Foreign Technology Div Wright-Patterson AFB Ohio
E. N. Martinson, and B. I. Plechev. 27 Feb 67, 6p Rept no. FTD-HT-67-19
Unedited rough draft trans. of Patent (USSR) 159 598, appl. no. 807686/24-6, 13 Dec 62.

Descriptors: (*Vacuum pumps, Adsorption), USSR, Patents, Jet pumps, Helium group gases, Steam.

The article describes a vacuum - pumping unit which contains a steam ejector and a sorption pump, which for the purpose of decreasing residual pressure and accomplishing a periodical or continuous pumping out of the weakly absorbent inert gases, there are connected up to the pumped - out area in two paralled rows zeolite cooled pumps in sequence with which there is installed a steam and water trap for water vapors.
AD-655 353 HC$3.00 MF$0.65

13L. Safety Engineering

FIRE TESTS OF TWO REMOTE AREA FIRE SUPPRESSION SYSTEM CONCEPTS.
Final rept.,
Factory Mutual Research Corp., Norwood, Mass.
J. B. Smith, M. J. Miller, and R. L. Pote, Jr. 29 Nov 65, 76p Rept. no. 15974-1
Contract NBy-62167

Descriptors: (* Fire extinguishers, Tests), Sprinklers, Buildings, Halogenated hydrocarbons, Freons, Water, Gas flow, Temperature, Fires, Toxicity, Pipes, Fire alarm systems, Bromine compounds, Fluorine compounds, Fire safety.
Identifiers: Bromotrifluoromethane.

Two packaged, self-contained fire suppression systems were fire tested to determine which would best meet the remote area fire protection needs. Results of 31 tests indicate that the multi-cycle, total flooding system using bromotrifluoromethane is superior to the automated sprinkler system using water. (Author)
AD-475 343 HC$3.00 MF$0.65

SAFETY PROCEDURES FOR HIGH ENERGY FUELS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
D. W. Dembrow. 4 Feb 58, 18p Rept no. CF-2711
Contract NOrd-7386

Descriptors: (* Boranes, Safety), (* Fuels, Safety), (* Rocket propellants, Safety), Diboranes, Pentaboranes, Decaboranes, Toxicity, Lethal dosage, Hazards, Detection, Diagnosis, Flammability, Fire safety.

The report deals with safety problems likely to be encountered in handling boron-hydrogen compounds and their hydrocarbon derivatives (esp. diborane, pentaborane, decaborane, HEF-2, HEF-3). Topics include: properties, toxicity (maximum allowable concentrations, lethal concentration and dosage), hazard, detection, symptoms, first aid, inflammability.
AD-655 423 HC$3.00 MF$0.65

13M. Structural Engineering

SONIC BOOM EXPERIMENTS AT EDWARDS AIR FORCE BASE.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 1B.
AD-655 310 HC$3.00 MF$0.65

INVESTIGATION OF CONCRETE IN EISENHOWER AND SNELL LOCKS ST. LAWRENCE SEAWAY.
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 11B.
AD-655 504 MF$0.65

TIME-COMPRESSION POTENTIAL OF AN EMERGENCY BLAST SHELTER PROGRAM.
Final rept.,
Hudson Inst Inc Harmon-on-Hudson N Y
William M. Brown, Basin Candela, Stanton Candlin, Robert A. Kurpka, and Robert Panero. 9 May 67, 94p Rept no. HI-774-RR
Contract OCD-PS-66-30

Descriptors: (* Fallout shelters, * Construction materials), (* Radioactive fallout, * Civil defense systems), Blast, Shock waves, Tables, Design, Construction, Costs, Decision making, Urban planning, Urban areas, Nuclear warfare, Mobilization, Management planning, Time.

An examination is made of the nation's potential for very rapid construction of an urban blast shelter system during severe nuclear crises. Assuming the existence of the necessary plans and preparations for a major civil defense mobilization involving nearly the entire U. S. population, it is found that the material and labor resources of the U. S. should permit an austere shelter system to be constructed within a few (i.e., 2-4) weeks. Austerity in the above sense would mean: (a) crowded shelters (2-3 people occupying a space normally allotted for one); and (b) deferring to a later time the installation of entrances, ventilation, and other habitability items. The time estimates are made on technical considerations alone. It is assumed that the important problems of planning, organizing, administrating, and decision-making would not significantly delay the program.
AD-655 519 HC$3.00 MF$0.65

ANALYSIS OF TOROIDAL SHELLS WITH INITIAL DISPLACEMENTS.
Technical rept.,
Pennsylvania State Univ University Park Dept of Engineering Mechanics
J. Kiusalaas, and K. S. Dhanju. Jun 67, 59p Rept no. TR-1
AROD-5102:4-E
Contract DA-31-124-ARO (D)-293
See also AD-655 522.

Descriptors: (* Structural shells, Numerical analysis), Bodies of revolution, Theory, Bending, Stresses, Force (Mechanics), Loading (Mechanics), Distortion, Defects (Materials).

An approximate method for analyzing toroidal shells by linear bending theory is presented. Special emphasis is placed on the influence of initial displacements of the meridian, due to manufacturing imperfections, in determining the stresses and displacements of the shells. The results of the analysis are compared with strain gage readings for the case of uniform normal pressure. A reasonable agreement is obtained only if the effects of the imperfections are included in the analysis. Methods of solution for axial forces and centrifugal loads are also given; the former is shown to be insensitive to the initial displacements, while the sensitivity of the latter depends on the source of the loading (fluid enclosed in the shell or the shell material itself). (Author)
AD-655 520 HC$3.00 MF$0.65

ANALYSIS OF TOROIDAL SHELLS OF CIRCULAR CROSS-SECTION WITH INITIAL DISPLACEMENTS.
Final rept.,
Pennsylvania State Univ University Park Dept of Engineering Mechanics
J. Kiusalaas. Jun 67, 4p
AROD-5102:5-E
Contract DA-31-124-ARO (D)-293
See also AD-655 520.

Descriptors: (* Structural shells, Bodies of revolution), Loading (Mechanics), Distortion, Defects (Materials), Bending, Theory, Stresses, Numerical analysis, Force (Mechanics).

The role of initial displacements in the analysis of toroidal shells under various loading conditions was pointed out by deriving the shell equations of Zenova and Novozhilov, which were modified such as to include the highest-order terms in initial displacements. It was shown that the stresses and displacements are very sensitive to the imperfections in the case of uniform pressure; on the other hand, the analysis is comparatively immune if the

loading consists of forces or moments applied to the edges of the shell. (Author)
AD-655 522 HC$3.00 MF$0.65

TEST AND EVALUATION OF COMPUTER ANALYSIS PROGRAMS FOR SHELTERS IN BUILDINGS.
Final rept.,
Ammann and Whitney New York
Samuel Weissman, Pat DiNapoli, and Edward Cohen. May 67, 100p
Contract OCD-PS-65-72

Descriptors: (*Fallout shelters, *Buildings), (*Computer programs, *Civil defense systems), Nuclear weapons, Factor analysis, Blast, Gamma rays, Shielding, Construction materials, Costs, Nuclear explosion damage, Fires.

The report presents the results of a project to test and evaluate four computer programs developed by the Office of Civil Defense, in order to determine their usefulness in engineering analysis or review of protective structures for civil-defense purposes. The programs are (1) Dynamic Response of High-Rise Buildings to Nuclear Blast Loading-Linear Dynamic Analysis, (2) Dynamic Response of High-Rise Buildings to Nuclear Blast Loadings-Nonlinear Dynamic Analysis, (3) Analysis of Structures for Fallout Gamma Radiation Shielding, and (4) Reusability of Buildings after a Warfire. Two actual high-rise building designs, a reinforced-concrete frame structure and a structural-steel frame structure, were used as prototypes for the evaluation. The programs were used to perform analyses to determine necessary structural modifications to incorporate blast and fallout protective design features in the original design of each building for the 2,5 and 10 psi overpressure ranges for a 10-MT nuclear weapon. The fire protective capability of the buildings for each protective design was also evaluated. Structural modifications and incremental cost are presented in the form of engineering case studies. A comparison of computational costs for the test buildings by the computer method used, with costs estimated assuming the analyses were performed by manual methods is presented. Other evaluations were made pertaining to (1) input forms and computer operation, (2) economies of design, (3) completeness of programs, (4) flexibility of programs, (5) use of the programs separately or together.
AD-655 538 HC$3.00 MF$0.65

DYNAMIC SHEAR RESISTANCE OF THIN-WEBBED REINFORCED CONCRETE BEAMS.
Rept. for Dec 65-Nov 66,
Naval Civil Engineering Lab Port Hueneme Calif
David S. Fuss. Jun 67, 97p Rept no. NCEL-TR-534

Descriptors: (*Beams (Structural), Reinforced concrete), Reinforcing materials, Loading (Mechanics), Dynamics, Tensile properties, Shear stresses, Structural shells.

Experiments were performed to obtain information on the dynamic shear and diagonal tension resistance of reinforced concrete I-beams constructed with welded-wire fabric as web reinforcement. These experiments were in support of the ultimate objective of the project, which is a formulate design criteria for thin-shell concrete structures to withstand dynamic loading such as is produced by the detonation of a nuclear weapon. Under uniformly distributed loads, the dynamic diagonal tension resistance of the beams was found to be significantly greater than the static diagonal tension resistance. The increase in resistance was attributed to the increase in tensile strength of concrete under rapid stressing. The ultimate shear resistance of the beams could not be precisely determined from the tests because only three of the beams failed in shear. However, evidence was found that the dynamic ultimate resistance of such beams is only slightly greater than the static ultimate resistance. (Author)
AD-655 823 HC$3.00 MF$0.65

THERMAL CONDUCTIVITY OF WOOD-BASE FIBER AND PARTICLE PANEL MATERIALS.
Forest Products Lab., Madison, Wis.
For primary bibliographic entry see Field 11L.
PB-175 520 HC$3.00 MF$0.65

14. METHODS AND EQUIPMENT

14A. Cost Effectiveness

STUDY OF A PLANNING-PROGRAMMING-BUDGETING SYSTEM FOR TRANSPORTATION. VOLUME I. SYNOPSIS.
Planning Research Corp Los Angeles Calif
For primary bibliographic entry see Field 5A.
AD-655 187 HC$3.00 MF$0.65

STUDY OF A PLANNING-PROGRAMMING-BUDGETING SYSTEM FOR TRANSPORTATION. VOLUME II. PPB SYSTEM METHODOLOGY.
Planning Research Corp Los Angeles Calif
For primary bibliographic entry see Field 5A.
AD-655 188 HC$3.00 MF$0.65

STUDY OF A PLANNING-PROGRAMMING-BUDGETING SYSTEM FOR TRANSPORTATION. VOLUME III. EXERCISING THE P P B SYSTEM.
Planning Research Corp Los Angeles Calif
For primary bibliographic entry see Field 5A.
AD-655 189 HC$3.00 MF$0.65

VALUE ENGINEERING.
Assistant Secretary of Defense (Installations and Logistics) Washington D C
For primary bibliographic entry see Field 5A.
AD-655 294 MF$0.65

SST AN ECONOMIC ANALYSIS. PART I. EXECUTIVE SUMMARY,
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 603 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART I. EXECUTIVE SUMMARY, PRELIMINARY SUPPLEMENT I,
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 604 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART I. EXECUTIVE SUMMARY, PRELIMINARY SUPPLEMENT II,
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 605 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. A. AIR TRAVEL DEMAND ANALYSIS,
Systems Analysis and Research Corp Boston Mass
For primary bibliographic entry see Field 1C.
AD-655 606 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. B. COST PERFORMANCE.
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 607 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. C. SONIC BOOM.
Institute for Defense Analyses Arlington Va Economic and Political Studies Div
For primary bibliographic entry see Field 1C.
AD-655 608 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. D. ROUTE SIMULATION.
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 609 HC$3.00 MF$0.65

SST AN ECONOMIC ANALYSIS. PART III. CONTRACTOR'S REPORTS. E. FINANCIAL CAPABILITY.
Department of Commerce Washington D C
For primary bibliographic entry see Field 1C.
AD-655 610 HC$3.00 MF$0.65

MULTIVARIATE LOGARITHMIC AND EXPONENTIAL REGRESSION MODELS,
Rand Corp Santa Monica Calif
C. A. Graver, and H. E. Boren, Jr. Jul 67, 147p
Rept no. RM-4879-PR
Contract F44620-67-C-0045

Descriptors: (*Multivariate analysis, Mathematics), (*Probability, *Least squares method), Errors, Costs, Computer programs, Mathematical prediction, Statistical distributions, Mathematical models.

This study analyzes a multivariate exponential regression function. Two basic types of error assumptions are examined: multiplicative (logarithmic model) and additive (exponential model). The usual method of taking natural logarithms of the regression relationship and then using linear least-squares estimators for the parameter estimates assumes that the error is multiplicative. Analysis shows that only the estimate of the parameter in the coefficient term and its distribution are affected by whether the hypothetical regression function is equal to the expected value (the mean) of the dependent variable Y, or to the median. The other parameter estimates, their distribution, and the prediction interval of Y are not affected. The study also examines the exponential, or additive, model in which the error is assumed to be normally distributed and added to the function. This leads to the more difficult problem of least-squares estimation of a nonlinear form. Such a solution is not exact and may not be unique. Methods of comparing the two models are given. The bulk of the Memorandum describes, lists, and gives instructions for use of the Multivariate Logarithmic and Exponential Computer Program.
AD-655 768 HC$3.00 MF$0.65

14B. Laboratories, Test Facilities, and Test Equipment

PROCEEDINGS OF THE CONFERENCE ON THE DESIGN OF EXPERIMENTS IN ARMY RESEARCH DEVELOPMENT AND TESTING CONDUCTED AT DIAMOND ORDNANCE FUZE LABS AND NATIONAL BUREAU OF STANDARDS (3rd) 16-18 OCTOBER 1957.
Army Research Office, Durham, N. C.
1957, 277p Rept. no. 58-5

Descriptors: (*Aerodynamic characteristics, *Armed Forces research), Fuzes (Ordnance), Statistical analysis, Mathematical analysis, Scientific research.

The Army Mathematics Advisory Panel, now called the Army Mathematics Steering Committee

(AMSC), was established in 1954 by the Office of Ordnance Research to provide advice on the mathematical needs of the Army to the Chief, Research and Development, Office, Deputy Chief of Staff for Plans and Research, Department of the Army. Soon after it was organized the AMSC conducted a survey of the mathematical activities and requirements of more than 30 Army research, development and testing facilities. One of the most frequently mentioned needs expressed by the Scientific personnel of these establishments was for greater knowledge of the modern statistical theory of the design and analysis of experiments. The present volume is the Proceedings of the Third Conference, and it contains 24 papers which were presented at this meeting. (Author)
AD-209 113 HC$3.00

PULSED MAGNETIC-FIELD MILLIMETER WAVE GENERATOR.
Stanford Univ., Calif. Microwave Lab.
For primary bibliographic entry see Field 9E.
AD-283 034 HC$3.00

RUN-UP BY IMPULSIVELY GENERATED WATER WAVES.
Naval Civil Engineering Lab., Port Hueneme, Calif.
For primary bibliographic entry see Field 8C.
AD-454 728 HC$3.00

SIMPLE CIRCUIT FOR OBTAINING RASTERED OSCILLOSCOPE DISPLAYS ON TEKTRONIX OSCILLOSCOPES.
Revised ed.,
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
G. F. Marsters, and E. Wachsler. 26 Sep 66, 2p
Revision of manuscript submitted 3 Aug 66. Research supported in part by Nonr.
Availability: Published in The Review of Scientific Instruments v38 n2 p276-7 Feb 1967.

Descriptors: (*Oscilloscopes, *Circuits), Test equipment (Electronics), Attenuation, Design, Shock tubes, Measurement, Shock waves, Test methods, Resolution.

The purpose of the study is to describe a very simple solid state raster device which does not require any internal modifications of the oscilloscope. This device was designed for a Tektronix 545A oscilloscope and has been used for shock speed measurements. However, the device should function equally well with other makes and models of oscilloscopes which have a gate and a sawtooth available. Free running operation requires only a sawtooth. (Author)
AD-655 193 Not available from CFSTI.

DESIGN OF AN INTEGRATED WIDEBAND AMPLITUDE-MODULATED NOISE SOURCE.
Technical rept.,
Army Electronics Command Fort Monmouth N J
Russell A. Gilson, and Randolph A. Reitmeyer, Jr. May 67, 20p Rept no. ECOM-2829

Descriptors: (*Noise generators, Amplitude modulation), Radiofrequency generators, Broadband, Miniature electronic equipment, Integrated circuits, Relaxation oscillators.

The report describes the results of a project directed towards designing and constructing a miniature, wideband, AM-modulated, noise generator. The modulated noise generator is a circuit that can test the operational performance of a typical AM receiver on a go no-go basis. In other words, this single circuit serves and accomplishes the same task (without electronic tuning) that a tuneable, modulated, signal generator does when making operational tests on AM receiving equipment. The report also discusses the selection of the noise source and audio oscillator used to amplitude modulate the noise source. It is seen that by choosing an audio relaxation oscillator to drive a single diode as a noise source, a circuit may be realized that may be fabricated using hybrid integrated circuit techniques. The impact of the hybrid integrated circuit techniques is that the noise generator size is substantially reduced to the point that it may be incorporated in the actual AM receiver to be tested. (Author)
AD-655 258 HC$3.00 MF$0.65

ENVIRONMENT OF THE NLABS ANNEX.
Technical rept.,
Army Natick Labs Mass Earth Sciences Div
Donald W. Hogue. Sep 66, 122p Rept no. ES-30
USA-NLABS-TR-67-9-ES

Descriptors: (*Armed forces research, Laboratories), (*Medical research, *Environmental tests), Test facilities, Army equipment, Climatology, Geology, Terrain, Maps, Tables, Forestry, Military medicine, Meteorological parameters, Plants (Botany), Swamps, Drainage, Soil mechanics, Atmospheric precipitation, Snow.

The report describes the environmental conditions at the U. S. Army Natick Laboratories Annex. This facility provides a nearby, adequately large area in an essentially rural locality for conducting field research and for developing and testing materiel. There are important environmental contrasts in slope, soil, drainage, vegetation, and in microclimate. Its climate is generally representative of intermediate climatic conditions. Characteristic landforms consist of level to slightly undulating lowlands and oval-shaped hills. The larger hills, rounded by glacial action, form conspicuous features that are over a hundred feet higher than the adjacent lowland. Swamps and marshes are numerous, vary greatly in size, and occur in lower parts of many lowlands. However, their extent in relatively level areas varies considerably with the amount of precipitation and season of the year. Soils occurring in the reservation are closely related to elevation, texture of glacial materials, and drainage. Stony, loamy sand soil derived from granite and gneiss material occurs on well-drained hills. Most of the lowlands have a loamy sand soil, but muck and peat are found in poorly drained areas. Daily maximum temperatures in summer average about 79F; daily minima in winter are 32F and below almost every day from December through March. Mean annual precipitation is 46.31 inches. Mean annual snowfall is about 57 inches. Severe flooding occurs infrequently. The reservation is covered most with mixed deciduous hardwoods and conifers. The forests have been cut over many times but some dense stands of hardwood saplings occur in more recently abandoned fields.
AD-655 278 HC$3.00 MF$0.65

ANIP FLIGHT PATH GENERATOR FINAL REPORT AND MAINTENANCE INSTRUCTIONS: PHASE II.
Douglas Aircraft Co Inc El Segundo Calif
May 61, 97p
Contract Nonr-1076 (00)
Prepared in cooperation with General Electric Co., Ithaca, N. Y., Advanced Electronics Center; and Cornell Univ., Ithaca, N. Y., See also AD-294 372.

Descriptors: (*Flight simulators, Flight paths), Display systems, Maintenance, Computers, Training devices, Operation, Design.

The purpose of the Flight Path Generator is to draw, on the display plane, a perspective picture of a command flight path which is oriented in space with respect to the aircraft. The drawing of this perspective picture is an exact mathematical transformation of the flight path onto the display plane. This flight path has six degrees of freedom and is made up of a series of elements, circles, of prescribed radius and spacing located on a hypothetical surface in space which is referred to as the flight path plane. The flight path generator just completed by General Electric has accomplished the following objectives: (a) The mathematical analysis of the flight path has been completed and checked out in an actual implementation which can be used for human engineering evaluation. The implementation has six degrees of freedom and allows full 360-degree rotation through all aircraft angles. (b) Digital techniques were used to implement the principal part of the computation to allow for improved compatibility with the central computer. This also simplifies the step to micro packaging for a flyable version. (c) Use of the general building block approach with pluggable interwiring allows the equipment to be easily reprogrammed. (d) Standard analog building blocks have been developed for use as output devices which can operate over an extended temperature range. This minimizes the amount of redesign that would be necessary for a flyable version. (Author)
AD-655 298 HC$3.00 MF$0.65

MULTIPLE-POINT MANOMETER WITH DYNAMIC COMPENSATION AND DISTANCE REGISTRATION,
Foreign Technology Div Wright-Patterson AFB Ohio
N. N. Chernov, V. I. Volkov, and K. E. Monakhov. 27 Feb 67, 7p Rept no. FTD-HT-67-20
Unedited rough draft trans. of Patent (USSR) 155 113, appl. no. 739546/26-10 24 Jul 61.

Descriptors: (*Manometers, Instrumentation), Pressure gages, Recording systems, Patents, USSR.

The patent describes a multiple-point manometer with dynamic compensation and distance registration on a printing device, the manometer having a bellows like pickup of pressures and fastened onto a weight lever, the contact arm of which is united through a coil spring and a conveyer-type pull-rod with a group shaft kinematically joined with an electric motor through a reducer, a pulse unit and an electronic memory and recording device, which for the purpose of connecting in electronic counters at a given initial pressure it is provided with a device consisting of two disks, one of which is kinematically joined with the group shaft, and the other with an electric motor and a photosensor which passes a signal for connecting in the electron counters at the moment of coinciding of the disk openings. (Author)
AD-655 354 HC$3.00 MF$0.65

AERODYNAMIC EXPERIMENTS ON AIRCRAFT,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1A.
AD-655 357 HC$3.00 MF$0.65

INVESTIGATION OF INTERFEROMETRY FOR THE ANALYSIS OF ENCLOSED HABITABLE ATMOSPHERES.
Block Engineering Inc Cambridge Mass
For primary bibliographic entry see Field 6K.
AD-655 396 HC$3.00 MF$0.65

CALIBRATION OF SKIN FRICTION BALANCE DISCS FOR PRESSURE GRADIENT.
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 20D.
AD-655 414 HC$3.00 MF$0.65

A LABORATORY FLYING SPOT SCANNER FOR VIDEO GENERATION,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Fred E. Nathanson, and Robert H. Grauel. 12 Feb 59, 29p Rept no. CF-2789
Contract NOrd-7386

Descriptors: (*Scanning, Design), Cathode ray tubes, Photomultipliers, Optical scanning, Laboratory equipment, Video signals.

The flying spot scanner consists of the following elements: a cathode ray tube with the beam deflected in a line or raster pattern; a lens system to focus the image on the face of the CRT on a glass photographic transparency which can be accurately positioned and made to translate at a uniform rate in one coordinate by a motor drive. A lens system focuses light passing through the photographic transparency onto the photo sensitive surface of a photo-multiplier tube to provide a video output signal as a function of time which represents the transparency function of the photographic slide.
AD-655 418 HC$3.00 MF$0.65

A REPETITIVE MECHANICAL PHOTOFLASH TIMER FOR THE MILLISECOND REGION,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 14E.
AD-655 421 HC$3.00 MF$0.65

PRELIMINARY MANNING AND TRAININGS REQUIREMENTS FOR THE AUTOMATIC TEST SYSTEM (ATS) SS46-23X.
Naval Personnel Research Activity San Diego Calif
For primary bibliographic entry see Field 5I.
AD-655 432 HC$3.00 MF$0.65

TEMPORAL AND LUMINOUS CALIBRATION OF THE NAVY FLASHBLINDNESS TRAINING DEVICE.
Phase rept.,
Naval Air Development Center Johnsville Pa Aerospace Medical Research Dept
Gloria T. Chisum. 30 Jun 67, 17p Rept no. NADC-MR-6706

Descriptors: (*Flashblindness, *Training devices), Calibration, Luminescence, Spectra (Visible + ultraviolet), Illumination, Cornea, Retina, Instrumentation, Measurement.

Temporal and luminance measurements of the energy output of the Navy flashblindness training device developed by BioTechnology, Inc. were made by personnel of the U. S. Naval Air Development Center. The purposes of these measurements were to determine the temporal characteristics of the flash, the spectral distribution of the visible portion of the energy, the illumination at the cornea and on the retina of an observer. Plots are given in the report which show the results of these measurements. Results indicated that the illumination produced by the flash source at the corneal plane is 637.8 lumen-seconds/sq cm. (Author)
AD-655 435 HC$3.00 MF$0.65

VARIABLE PARAMETER POWER SOURCE.
Naval Air Development Center Johnsville Pa Aero-Electronic Technology Dept
For primary bibliographic entry see Field 10B.
AD-655 440 HC$3.00 MF$0.65

INVESTIGATION OF THE EFFECTS OF RADIANT HEAT ON THE STRUCTURAL EFFICIENCY OF AIRCRAFT AND MISSILE COMPONENTS MADE OF GLASS-FIBER-REINFORCED PLASTIC LAMINATES.
Naval Air Engineering Center Philadelphia Pa Aeronautical Structures Lab
For primary bibliographic entry see Field 11I.
AD-655 442 HC$3.00 MF$0.65

AUTOMATED DATA PROCESSING AND CONTROL SYSTEM FOR TEST EQUIPMENT.
Naval Avionics Facility Indianapolis Ind
For primary bibliographic entry see Field 5A.
AD-655 469 HC$3.00 MF$0.65

NDRC INFRA-RED GAS ANALYZER FOR CARBON MONOXIDE.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 6K.
AD-655 578 HC$3.00 MF$0.65

GRAVITATIONAL CLINOMETER.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8B.
AD-655 707 HC$3.00 MF$0.65

SELF MODULATING, DERIVATIVE OPTICAL SPECTROSCOPY. PART II. EXPERIMENTAL,
National Electrotechnical Inst Turin (Italy)
G. Bonfiglioli, P. Brovetto, G. Busca, S. Levialdi, and G. Palmieri. 25 Aug 66, 11p
AFOSR-67-1656
Grant AF-EOAR-27-66
Availability: Published in Applied Optics v6 p447-55 Mar 1967.

Descriptors: (*Spectrophotometers, Design), Absorption spectrum, Instrumentation, Optical instruments, Photomultipliers, Electronic equipment, Modulation, Italy.

The present paper follows a previous one (AD-616 457) that dealt with the theoretical principles of a self modulating derivative optical spectrometer (SMODOS). In this paper the complete description is given of a prototype of such an instrument, namely, of its optical as well as electronic components. The project criteria are thoroughly discussed, and some examples of performance that demonstrate the power of the method are presented. (Author)
AD-655 758 Not available from CFSTI.

GROUND TEST FACILITIES FOR AEROTHERMODYNAMIC SIMULATION OF BALLISTIC REENTRY VEHICLE NOSE-TIP CONDITIONS,
Aerospace Corp El Segundo Calif Labs Div
For primary bibliographic entry see Field 22C.
AD-655 784 HC$3.00 MF$0.65

HIGH TEMPERATURE EVAPORATION TESTER AND METHOD FOR DETERMINING VOLATILITY OF FLUIDS AND SEMISOLID MATERIALS.
Technical rept.,
Air Force Materials Lab Wright-Patterson AFB Ohio
John B. Christian. Nov 65, 23p Rept no. AFML-TR-65-370

Descriptors: (*Evaporation, Test methods), (*Lubricants, Vaporization), Greases, Oils, Test equipment, High-temperature research.

The report describes the test procedure and apparatus for the determination of evaporation loss of fluid and of semisolid materials for application where evaporation loss is a significant factor. The sample to be tested is placed in a closed evaporation cell in an aluminum test block maintained at the desired test temperature. Heated air is passed over the surface of the sample for a specified period of time. The evaporation loss is calculated from the loss in weight of the sample. Evaporation data can be obtained at any temperature in the range of 210 to 1000F. (Author)
AD-655 790 HC$3.00 MF$0.65

THE DEVELOPMENT OF A GERDIEN CONDENSER FOR SOUNDING ROCKETS,
Utah Univ Salt Lake City Upper Air Research Labs
For primary bibliographic entry see Field 4A.
AD-655 808 HC$3.00 MF$0.65

A DESCRIPTION OF FOUR WIND-TUNNEL DYNAMIC MEASURING TECHNIQUES.
Research and development rept.,
David Taylor Model Basin Washington D C Aerodynamics Lab
Edwin B. O'Neill, and Kenneth A. Phillips. Mar 67, 60p Rept no. Aero-1122
DTMB-2296

Descriptors: (*Pitch (Motion), *Damping), (*Aerodynamic characteristics, Measurement), Test methods, Wind tunnels, Oscillation, Flight, Free flight models, Cylindrical bodies, Conical bodies.

Results of a study comparing the damping-in-pitch parameter as obtained from four experimental techniques are presented. Each of the methods is briefly described and measured values given. The four methods used were: a single degree-of-freedom free oscillation, a single degree-of-freedom forced oscillation, a three-degree-of-freedom free oscillation, and a free-flight scheme. The damping-in-pitch compares reasonably well, though some data scatter exists. The forced oscillation measurements are shown to yield the more consistent values. All of the experimental schemes are shown to yield highly accurate static force and moment coefficient slopes. (Author)
AD-655 825 HC$3.00 MF$0.65

PILOT PERFORMANCE, TRANSFER OF TRAINING AND DEGREE OF SIMULATION. II. VARIATIONS IN AERODYNAMIC COEFFICIENTS.
Life Sciences Inc Fort Worth Tex
For primary bibliographic entry see Field 5I.
AD-655 837 HC$3.00 MF$0.65

AIR HEATING BY A ROTATING ARC WITH COLD GAS FLOW TRANSVERSE TO THE AXIS OF THE ARC.
Aufheizung Von Luft Mit Einem Querangestromten Rotierenden Lichtbogen
Deutsche Forschungsanstalt Fuer Luft- Und Raumfahrt, Stuttgart (West Germany).
K. P. Anders, F. V. Burger-scheidlin, and R. F. Neubauer. Dec 66, 18p DLR-MITT.-66-22
in German, English Summary

Descriptors: *Arc heating, *Direct current (dc), *Electrode, *Gas flow, Arc, Atmospheric, Axis, Cold gas, Control, Cooling, Copper, Current, Dc, Direct, Expansion, Flow, Gas, Heating, Jet, Mach number, Pressure, Rectifier, Rotation, Transverse, Water.

For abstract, see STAR 05 17.
N67-30447 HC$3.00 MF$0.65

MATERIALS FOR ELECTROCHEMICAL CELL SEPARATORS SUMMARY REPORT.
TRW Equipment Labs., Cleveland, Ohio. Materials Technology.
For primary bibliographic entry see Field 10C.
For abstract, see STAR 05 17.
N67-30685 HC$3.00 MF$0.65

WAYS OF PREVENTING SUPERPOSITION IN GRATING SPECTRA.
Specola Vaticana (Vatican City). Laboratorio Astrofisico.
For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 17.
N67-30700 HC$3.00 MF$0.65

THE LARGE GLASS PRISM SPECTROGRAPH G 80 OF A. GATTERER.
Specola Vaticana (Vatican City). Laboratorio Astrofisico.

For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 17.
N67-30701 HC$3.00 MF$0.65

THE 534 CM EBERT- FASTIE SPECTROGRAPH OF THE ASTROPHYSICAL LABORATORY.
Specola Vaticana (Vatican City). Laboratorio Astrofisico.
For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 17.
N67-30703 HC$3.00 MF$0.65

FIRST AND SECOND SIMULATOR EVALUATIONS OF ADVANCED INTEGRATED DISPLAY AND CONTROL SYSTEMS.
Ling-temco-vought, Inc., Dallas, Tex.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 17.
N67-30804 HC$3.00 MF$0.65

A METHOD FOR MEASURING MINIMAL OIL LAYERS IN VACUUM SYSTEMS.
Eine Methode Zur Messung Geringster Oelbedeckungen in Vakuumsystemen
Oesterreichische Studiengesellschaft Fuer Atomenergie G.M.B.H., Seibersdorf. Reaktorzentrum Seibersdorf.
R. Dobrozemsky, W. K. Huber, and F. P. Viehboeck. 1967. 18p SGAE-PH-53/1967
in German. English Summary Submitted for Publication

Descriptors: *Radioactive isotope, *Thin film, *Trace element, *Ultrahigh vacuum, Counter, Element, Film, Isotope, Measurement, Method, Oil, Scintillation, Sensitivity, System, Thickness, Thin, Trace, Tritium, Ultrahigh, Vacuum.

For abstract, see STAR 05 17.
N67-30893 HC$3.00 MF$0.65

A METHOD OF CALCULATING WIND TUNNEL INTERFERENCE FACTORS FOR TUNNELS OF ARBITRARY CROSS-SECTION.
Washington Univ., Seattle. Coll. of Engineering.
R. G. Joppa. Jul 67, 32p NASA-CR-845
Contract NGR-48-002-010

Descriptors: *Interference, *Velocity, *Wind tunnel wall, Boundary, Calculation, Condition, Cross section, Lattice, Method, Tunnel, V/stol aircraft, Vortex, Wall, Wind.

For abstract, see STAR 05 17.
N67-30923 HC$3.00 MF$0.65

STING-SUPPORT INTERFERENCE ON LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF CARGO-TYPE AIRPLANE MODELS AT MACH 0.70 TO 0.84.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 17.
N67-31054 HC$3.00 MF$0.65

MICROBIOLOGICAL FLORA OF HUMAN SUBJECTS UNDER SIMULATED SPACE ENVIRONMENTS FINAL REPORT, AUG. 1965 - OCT. 1966.
Republic Aviation Div., Fairchild Hiller Corp., Farmingdale, N. Y.
For primary bibliographic entry see Field 6M.
For abstract, see STAR 05 17.
N67-31139 HC$3.00 MF$0.65

USE OF THE FABRY- PEROT INTERFEROMETER IN THE DETERMINATION OF THE INSTRUMENTAL FUNCTION OF A SPECTROGRAPHIC DEVICE.
Vikoristannya Interferometra Fabri-pero Dlya Viznachennya Aparatnoy Funktsii Spektral'nogo Priladu
Scientific Translation Service, La Canada, Calif.
YE. I.Guyvan, and V. B. Timofeyev. Jul 67, 4p NASA-TT-F-11126
Contract NASW-1496
Rransl. Into English From Ukr. Fiz. Zh. (iev), V. 11, Oct. 1966 P 1142-1144

Descriptors: *Fabry-perot interferometer, *Infrared spectrometer, *Spectrography, Collimator, Device, Energy, Function, Image, Infrared, Inlet, Instrument, Light, Monochromator, Optimum, Scanning, Slit, Spectrometer, Spectrum.

For abstract, see STAR 05 17.
N67-31189 HC$3.00 MF$0.65

SOME PROBLEMS OF MEASURING CURRENT VELOCITY BY THE DOPPLER METHOD.
Nekotoryye Voprosy Izmereniya Skorosti Tech-Eniy Dopplerov Skim Metodom
National Aeronautics and Space Administration, Washington, D. C.
V. I. Babiy. Jul 67, 17p NASA-TT-F-11056
Transl. Into English From Tr. Morsk. Gidrofiz. Inst., Akad. Nauk Sssr (Moscow), V. 36, 1966 P 146-162

Descriptors: *Doppler effect, *Flow meter, *Hydrodynamics, Angle, Current, Device, Drift, Effect, Flow, Liquid, Measurement, Meter, Shift, Sounding, Transformer, Velocity, Water.

For abstract, see STAR 05 17.
N67-31198 HC$3.00 MF$0.65

A FEASIBILITY STUDY ON MINIATURIZING AN AUTOMATIC AMINO ACID ANALYZER FOR USE ON APOLLO MISSION AND MARS VOYAGER MISSION PROGRESS REPORT, JAN. - JUN. 1967.
California Univ., La Jolla. Dept. of Chemistry.
For primary bibliographic entry see Field 7C.
For abstract, see STAR 05 17.
N67-31303 HC$3.00 MF$0.65

DESIGN AND PERFORMANCE OF AN AERODYNAMIC MOLECULAR BEAM AND BEAM DETECTION SYSTEM.
Virginia Univ., Charlottesville. Div. of Aeronautical Engineering and Engineering Physics.
O. F. Hagena, J. E. Scott, Jr., and A. K. Varma.
Jun 67, 125p NASA-CR-85824, AST-4038-103-67U
Contract NGR-47-005-046

Descriptors: *Aerodynamics, *Molecular beam, *Performance characteristics, Beam, Characteristics, Density, Design, Detection, Flight, Jet, Modulation, Molecular, Nozzle, Particle, Performance, System, Temperature, Time, Vacuum.

For abstract, see STAR 05 17.
N67-31331 HC$3.00 MF$0.65

HANDS-FREE, PRECISION CONTROL FOR SMALL HOVERING VEHICLES - A FLYING QUALITIES STUDY FINAL REPORT.
Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.
For primary bibliographic entry see Field 1C.
For abstract, see STAR 05 17.
N67-31406 HC$3.00 MF$0.65

PRELIMINARY DESIGN STUDY OF SLAMAST SCOUT- LAUNCHED ADVANCED MATERIALS AND STRUCTURES TEST-BED. VOLUME I - EXPERIMENT FEASIBILITY.
General Electric Co., Philadelphia, Pa. Missile and Space Div.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 17.
N67-31444 HC$3.00 MF$0.65

13CS2 SYNTHESIS FOR CARBON-13 NMR FIELD-FREQUENCY LOCK.
California Univ., Davis. Dept. of Chemistry.
For primary bibliographic entry see Field 7B.
PB-174 917 HC$3.00 MF$0.65

REPORT OF NRL PROGRESS.
Naval Research Lab., Washington, D. C.
Jul 67, 52p
Also available on subscription $15.00/yr domestic, $18.00/yr foreign.

Descriptors: (*Naval research, Reports), Electric currents, Hydrocarbons, Metallurgy, Ceramic materials, Stress corrosion, Metals, Structural properties, Magnetic tape, Radar.

Contents: The work required to produce an electric current; X-ray quasars. (Author)
PB-175 569 HC$3.00 MF$0.65

ELECTRICAL MEASUREMENTS: CONTRIBUTED PAPERS AND DISCUSSION,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
Robert L. Powell. 1967, 6p R-426
Published in Trace Characterization, Chemical and Physical p69-74. Presented at Materials Research Symposium (1st) NBS, Gaithersburg Md. Oct 3-7 1966, NBS-Mono-100 Apr 1967.

Descriptors: (*Microanalysis, Electrical properties), Test methods, Reviews, Dielectric properties, Crystal lattice defects, Impurities, Carriers (Semiconductors), Hall effect, Thermolectricity.

The papers contributed to the symposium which delt with electrical methods for trace characterization are summarized and discussed.
PB-175 620 HC$3.00 MF$0.65

CRYOGENIC THERMOCOUPLE THERMOMETRY,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
L. L. Sparks, and R. L. Powell. 1967, 24p R-427
Published in Measurements and Data v1 n2 p82-90 Mar-Apr 1967.

Descriptors: (*Cryogenics, Temperature sensitive elements), (*Thermocouples, Cryogenics), Wire, Standards, Calibration, Tables, Accuracy, Gold alloys, Iron alloys, Test methods.

Commercially available low-temperature thermocouple wire from all major U. S. manufacturers was exhaustively tested to determine the inhomogeneity and interchangeability characteristics of the wire. Spot calibrations between liquid-helium and liquid-nitrogen temperatures, and between liquid-nitrogen and ice temperatures, show that the NBS interim low-temperature tables are sufficient for most engineering and scientific requirements. Preliminary work on several gold-iron alloys indicates that these alloys will allow more accurate thermoelectric temperature measurement in the liquid-helium/liquid-hydrogen temperature range. Research, now well underway, will lead to establishment of standard thermocouple tables for temperatures from liquid helium up to 0C for all of the cryogenically useful commercial thermocouple alloys. (Author)
PB-175 621 HC$3.00 MF$0.65

ON THE PROBLEMS OF MEASURING TRANSIENT TEMPERATURE IN CRYOGENIC FLUIDS,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
C. E. Miller, and T. M. Flynn. 1967, 12p R-428
Published in ISA Transactions v6 p133-8 1967.

Descriptors: (*Cryogenics, Temperature sensitive elements), (*Liquefied gases, Test methods), (*Thermometers, Cryogenics), Temperature, Transients, Measurement, Sensors, Performance (Engineering), Thermocouples, Resistance thermometers, Standardization.

The complex and frequently unpredictable energy exchange mechanisms that govern the dynamic behavior of cryogenic sensors make the measurement of transient temperatures extremely difficult. Without suitable models by which to predict and evaluate sensor performance, considerable measurement errors can and do occur. The intent of the paper is to delineate in detail those factors which give rise to these errors. The validity of using notions based on the performance of the 'ideal' thermometer for characterizing the cryogenic case is also discussed. (Author)
PB-175 622 HC$3.00 MF$0.65

14C. Recording Devices

INVERSE CONVOLUTION FILTERS: AN ITERATIVE TECHNIQUE,
Texas Univ Austin Dept of Electrical Engineering
Oran Brigham, Jr., H. W. Smith, F. X. Bostick, Jr., and W. C. Duesterhoeft, Jr. 1967, 13p
AFOSR-67-1589
Grant AF-AFOSR-766-67
Availability: Published in 1967 SWIEEECO RECORD nF-72 p7-2-1-10 Apr 19 1967.

Descriptors: (*Geophysics, *Iterative methods), (*Measuring devices (Electrical + electronic), *Convergence), Signals, Digital systems, Electronic recording systems, Data processing systems, Electric filters, Integral transforms, Numerical analysis.

It is the objective of much geophysical work to increase the resolution of signals recorded on a sluggish measuring device. A solution is generally obtained by use of inverse digital filters. This treatment presents an iterative technique for obtaining stable inverse digital filters. It is shown that one can converge to this solution by operating in the time domain using the method of successive substitution.
AD-655 405 Not available from CFSTI.

EVALUATION OF RADAR VIDEO RECORDERS.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Gerald E. Titherington. May 67, 34p
FAA-RD-67-34

Descriptors: (*Magnetic recording systems, Video signals), (*Air traffic control systems, Electronic recording systems), Magnetic tape, Electronic recording systems, Effectiveness.

A TV tape recorder was evaluated to determine its operational value for recording and reproducing scan converted radar information. Although there is some degradation from the original 'live' display, the video tape record, which is not normally available, does enable personnel to reconstruct air traffic situations completely and accurately. The 'off-the-shelf' test recorder can be adapted to fulfill FAA requirements at Air Traffic Control Facilities having radar surveillance which incorporates the use of scan converters. (Author)
AD-655 635 HC$3.00 MF$0.65

14D. Reliability

PHYSICS OF FAILURE IN ELECTRONICS, VOLUME V,
Battelle Memorial Inst Columbus Ohio Columbus Labs
Theodore S. Shilliday, and Joseph Vaccaro. 1966, 574p
Symposium held at Battelle Memorial Inst., Columbus, Ohio, on November 15-17, 1966. Jointly sponsored by Rome Air Development Center and the Battelle-Columbus Labs. See also AD-637 529.

Descriptors: (*Failure (Electronics), Symposia), (*Reliability (Electronics), *Transistors), Semiconductor devices, Surface properties, Radiation damage, Electronic equipment, Degradation, Silicon, Integrated circuits.

The fifth in a series of annual symposia on the Physics of Failure in Electronics convened at Battelle Memorial Institute in Columbus, Ohio, on November 15, 16, and 17, 1966. It was jointly sponsored by Rome Air Development Center and the Battelle-Columbus Laboratories. There were about 535 individuals in attendance, thirty of them from seven foreign countries. Centering almost exclusively on scientific inquiry into material processes and phenomena influencing the degradation and failure of solid state electronic devices and related structures, the Symposium technical program contained two invited papers, twenty-seven contributed papers, and seven late-news papers.
AD-655 397 HC$3.00 MF$0.65

14E. Reprography

CAMERA TUBE WITH INTERNAL IMAGE-MOTION COMPENSATION.
Quarterly progress rept. no. 9, 1 Feb-30 Apr 65,
General Electric Co., Syracuse, N. Y. Pickup Tube Operation.
K. Schlesinger. 30 Apr 65, 36p
Contract DA-36-039-AMC-00128 (E)

Descriptors: (*Camera tubes, Image motion compensation), (*Image orthicons, Electron optics), Design, Deflection, Focusing, Voltage, Distribution, Electron beams, Electronic scanners, Feedback amplifiers, Direct current, Pulse generators, Circuits, Gates (Circuits).

Special circuitry for gating and deflecting the IMCO tube has been developed. It includes high-level d.c. feedback amplifiers for deflection (1200 volts c.t.), gating-pulse generators (up to 1000-volt pulse), and associated circuitry. Images can be shifted and then superimposed to test for coincidence and registry. This can be done on fixed and moving objects. Typical circuit features are described. Progress in tube construction and fixturing also is presented. (Author)
AD-470 058 HC$3.00 MF$0.65

WIDE LATITUDE PHOTOGRAPHY.
Revised ed.,
Army Electronics Command Fort Monmouth N J
Marilyn Levy. 28 Sep 66, 14p Rept no. ECOM-2830
Revision of manuscript submitted 30 Aug 66. Presented at the Annual Conference, San Francisco, Calif., 12 May 66.
Availability: Published in Photographic Science and Engineering v11 n1 p46-53 Jan-Feb 1967.

Descriptors: (*Wide-field cameras, *Photography), (*Aerial photography, *Photographic emulsions), Exposure meters, Photographic images, Photographic film, Luminescence, Photographic printers, Photographic processors, Image intensifiers (Electronics).

A simple method of developing photographic emulsions is described that markedly increases their exposure latitude. The developer, consisting of 1-phenyl - 3-pyrazolidone (1.5 gms) and sodium sulfite (30 gms), reduces the development gamma of most films so that values of 0.15 to 0.50 can be achieved without loss of toe speed. Luminance scales of 1 million can easily be recorded and printed when films are developed to a gamma of 0.15, and there are indications that even wider luminance scene ranges can be encompassed. With wide latitude development the exposure range through which high resolution can be maintained is greatly extended, and high resolving powers are obtained even when the film has received 100,000 times the correct exposure. In some cases this method of processing has also resulted in higher maximum resolving power.
AD-655 212 Not available from CFSTI.

A REPETITIVE MECHANICAL PHOTOFLASH TIMER FOR THE MILLISECOND REGION,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Spencer Raezer. 20 Dec 57, 8p Rept no. CF-2697
Contract NOrd-7386

Descriptors: (*Timing devices, Flash lamps), High-speed photography, Firing circuits, Relays, Timing circuits.

A mechanical timer has been developed which has a useful range from 0.10 to 100 milliseconds with an error of plus or minus 15.0 microseconds. It has been used successfully in connection with high-speed, multiple exposure photography in applications where electronic timers could not be employed. The device is constructed from standard, easily obtained parts. (Author)
AD-655 421 HC$3.00 MF$0.65

A GENERAL PURPOSE VIDEO INPUT DEVICE FOR A DIGITAL COMPUTER.
Bolt Beranek and Newman Inc Cambridge Mass
For primary bibliographic entry see Field 9B.
AD-655 642 HC$3.00 MF$0.65

ELECTRICALLY CHARGED SURFACES AND THE PHOTOGRAPHIC PROCESS,
North Carolina Univ Chapel Hill Dept of Physics
L. Slifkin, W. McGowan, A. Fukai, and J. -S. Kim. 29 Dec 66, 4p
AFOSR-67-1670
Grant AF-AFOSR-450-66
Availability: Published in Photographic Science and Engineering, v11 n2 Mar-Apr 1967.

Descriptors: (*Photography, Electrostatics), (*Photographic chemicals, Transport properties), (*Silver compounds, Ionic current), Carriers (Semiconductors), Crystal lattice defects, Surfaces, Impurities, Chlorides, Internal friction.
Identifiers: Silver chloride.

Ionic conductivity studies in AgCl give only the total Frenkel pair formation energy (1.44 ev, from Abbink and Martin). Here the separate energy of formation of the silver vacancy (and, by difference, that of the interstitial) is determined from the impurity dependence of the isoelectric temperature of dislocations. Two different techniques (deformation-induced voltage pulses and internal friction) give essentially the same result for the vacancy formation energy: 0.58 plus or minus approx. 0.05ev. Possible implications of these results for the photographic process are discussed. (Author)
AD-655 753 Not available from CFSTI.

A BIBLIOGRAPHY OF LASER APPLICATIONS.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 20E.
AD-655 774 HC$3.00 MF$0.65

PROBABILITY OF RECORDING SATELLITE IMAGES OPTICALLY.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
K. Lambeck. 5 Dec 66, 22p NASA-CR-84870, SAO SPECIAL REPT.-230
Grant NSG-87-60

Descriptors: *Optical tracking, *Photographic recording instrument, *Satellite observation, Angular, Camera, Capacity, Circular, Curve, Distance, Image, Instrument, Magnitude, Nomograph, Observation, Optical, Orbit, Photographic, Power, Probability, Recording, Satellite, Tracking, Velocity, Zenith.

For abstract, see STAR 05 17.
N67-30884 HC$3.00 MF$0.65

COHERENT PRODUCTION OF PARTICLES IN COLLISIONS OF 200 GE V PIONS WITH EMULSION NUCLEI.
Polish Academy of Sciences, Warsaw. Inst. of Nuclear Research.
For primary bibliographic entry see Field 20H.
For abstract, see STAR 05 17.
N67-31100 HC$3.00 MF$0.65

CINEMATOGRAPHY OF WEAKLY LUMINOUS TRANSIENT PHENOMENA USING IMAGE CONVERTERS.
Cinematographie de Phenomenes Transitoires Faiblement Lumineux A l'Aide D'amplificateurs de Luminance
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
C. Jacquot, and P. Stevenin. Nov 66, 22p CEA-R-3097
in French

Descriptors: *Cinematography, *Image converter, *Transient response, Converter, Image, Light, Response, Source, Spectrometry, Transient, Weak.

For abstract, see STAR 05 17.
N67-31154 HC$3.00 MF$0.65

15. MILITARY SCIENCES

15C. Defense

SHELTER ASSIGNMENT CONCEPT: A STUDY IN PUBLIC ACCEPTANCE.
Pittsburgh Univ Pa Dept of Sociology
For primary bibliographic entry see Field 5K.
AD-655 270 HC$3.00 MF$0.65

CIVIL DEFENSE SHELTER OPTIONS FOR FALLOUT AND BLAST PROTECTION (DUAL-PURPOSE).
Final rept. and Summary Mar 65-Nov 66,
IIT Research Inst Chicago Ill
A. Longinow. May 67, 234p
Contract OCD-PS-64-50

Descriptors: (*Civil defense systems, *Fallout shelters), Radioactive fallout, Nuclear explosion damage, Protection, Design, Underground explosions, Costs, Underground structures, Effectiveness, Blast, Maps, Economics, Construction, Tables.

The effort reported herein is concerned with civilian dual-use personnel shelters. Its primary objectives are: to determine for nuclear weapons environments other than fallout radiation alone, the extent of the economic advantages of dual-use shelter systems with respect to expected percent of population thus sheltered. To bring into sharper focus those areas in which more research or analysis is necessary in order to increase the effectiveness of this sheltering concept. Topics supplementary to the above objectives include: estimated construction trends in selected types of construction, a limited study on the use of expressway grade separations as dual-use shelters, and cost estimating and cost reporting as applied to dual-use shelters. Results of this effort dealing with a large number of existing related topics are contained in this report. These results are in the form of assembled and updated costs as well as physical and environmental data and conclusions. (Author)
AD-655 284 HC$3.00 MF$0.65

COUNTERFORCE, DAMAGE-LIMITING, AND DETERRENCE.
Rand Corp Santa Monica Calif
William A. Stewart. Jul 67, 23p Rept no. P-3385
Availability: Hard copy available from The RAND Corp., Santa Monica, Calif., $1.00.

Descriptors: (*Deterrence, *Military strategy), Cold war, Defense systems, Countermeasures, Nuclear warfare, Military psychology, Vulnerability, National defense, Psychological warfare, Political science.

The relationship of counterforce and damage-limiting to a policy of deterrence is discussed. Deterrence is essentially a threat relationship. Deterrence of the widest range of enemy aggressive actions is provided by a credible capability to strike first. Today, this is tantamount to a counterforce strategy. The credibility of a counterforce posture is in turn enhanced by conspicuous damage-limiting measures and particularly by defensive measures that make nuclear interchange outcomes less 'unthinkable' even under the least favorable conditions. To the extent that this can be buttressed by second strike retaliatory capabilities that guarantee overwhelming punishment of the aggressor in the event of a surprise, preventive, or preemptive attack, deterrence policy can continue to play a key role in safeguarding our society. It is concluded that the psychological and political attractions of certain strategies and certain capabilities may in the end prove more important than any rational, strategic calculus.
AD-655 341 Not available from CFSTI.

METHODOLOGY FOR ASSESSING TOTAL VULNERABILITY.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 15F.
AD-655 530 HC$3.00 MF$0.65

THE CHI-SQUARE TEST OF GOODNESS OF FIT FOR A MULTIVARIATE NORMAL DISTRIBUTION.
Naval Weapons Lab Dahlgren Va
For primary bibliographic entry see Field 12A.
AD-655 628 HC$3.00 MF$0.65

PRELIMINARY AERIAL INFRARED FIRE MAPPING SYSTEMS ANALYSIS.
HRB-Singer Inc State College Pa
For primary bibliographic entry see Field 15G.
AD-655 685 HC$3.00 MF$0.65

15E. Logistics

STATE OF THE ART SURVEY OF CARGO HANDLING SYSTEMS FOR GENERAL CARGO: FAST DEPLOYMENT LOGISTIC SHIP PROJECT.
Department of the Navy Washington D C
Mar 66, 76p
Availability: Hard copy available from Work Savings International, Washington, D. C., $2.75.

Descriptors: (*Handling, *Cargo), State-of-the-art reviews, Cargo ships, Hoists, Conveyors, Containers, Packaging, Hatches, Pallets, Fork-lift vehicles.

Contents: Basic ship types (solid hull, vertical loading, conventional ship) (solid hull, vertical load, container ship) (bow loading types) (stern loading types) (side loading types) (a study in the design of a ship from a cargo handling standpoint) (cargo submarine); Ship features affecting cargo handling (size and shape of hatches) (the all-hatch ship) (types of hatch covers) (horizontal rolling wing deck) (removable wing decks); Shipboard handling - vertical (derrick crane) (revolving cranes) (gantry crane) (elevator) (elevating conveyor) (vertical handling by fork lift trucks) (chutes); Shipboard handling - horizontal (manual handling) (fork lift trucks) (tractor trailer trains) (overhead monorail) (under deck bridge crane) (rail tracks); Characteristics of cargo (effects of size and weight) (handling characteristics of cargo) (comparative costs of break bulk, palletized and containerized cargo) (pallet systems) (container handling systems) (other unitizing methods); Sources of information and references.
AD-655 242 MF$0.65

BEHAVIOR OF BEACH FILL AND BORROW AREA AT SHERWOOD ISLAND STATE PARK WESTPORT, CONNECTICUT.
Technical memo.,
Army Coastal Engineering Research Center Washington D C
William H. Vesper. May 67, 33p Rept no. TM-20

Descriptors: (*Beaches, *Erosion), (*Seacoast, Connecticut), Military engineering, Armed forces research, Hydraulic systems, Walls, Sand, Filling, Maintenance, Tides, Construction, Costs.

In 1957, to restore and stabilize the beach of Sherwood Island State Park, sand was pumped to the shore from an offshore borrow area by a hydraulic pipeline dredge. In addition, two training walls were constructed to confine the inlet at the east end (updrift) and a groin built at the west end of the park. The entire beach was widened and raised, and in addition, an extra amount of sand was placed on Sherwood Point to act as a feeder beach. The material from the borrow area proved to be suitable beach fill. In 1962, surveys showed that while the actual net loss of sand from the project area was slight, losses from the tidal zone in the updrift and central parts of the area were major. These losses indicate that maintenance fill is now required and that the construction of several short groins west of Sherwood Point (downdrift) may be desirable. Data, in graphic form, show comparative profiles of the area, changes in shoreline, and composite size-distribution curves for sand samples. Tables show quantitative volume changes and sand sample data. Initial and annual cost figures are given.
AD-655 260 HC$3.00 MF$0.65

A STOCHASTIC DYNAMIC MULTIMODE TRANSPORTATION MODEL.
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 12B.
AD-655 344 HC$3.00 MF$0.65

PRESIDENTIAL CONTROL OF FORCE: THE KOREAN WAR AND THE CUBAN MISSILE CRISIS.
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 15G.
AD-655 373 HC$3.00 MF$0.65

NAVAL RESEARCH LOGISTICS QUARTERLY, VOL. 14, NO. 2, JUNE 1967.
Office of Naval Research Washington D C
Jun 67, 135p
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402 $0.50.

Descriptors: (*Queueing theory, *Linear programming), (*Operations research, *Functional analysis), Problem solving, Nonlinear systems, Mathematical programming, Asymptotic series, Mathematical models, Naval procurement.

Contents: Linear estimation of the location and scale parameters from Type II censored samples from symmetric unimodal distributions; A method for solving nonlinear maximum-problems depending on parameters; Simple stability of general n-person games; Inventory control of a multiproduct system with a limited production resource; A two-station stochastic inventory model with exact methods of computing optimal policies; Queues with stochastic service rates; A queueing system with multiple service time distributions; Programming the procurement of airlift and sealift forces: a linear programming model for analysis of the least-cost mix of strategic deployment systems; Some constraints on shipping in linear programming models; Revised tables for asymptotic efficiencies of the moment estimators for the parameters of the Weibull laws.
AD-655 430 MF$0.65

DEVELOPMENT OF A COMBAT BOOT LAST FOR THAI AND VIETNAMESE MILITARY FORCES.
Final rept. (Phase 2), 11 Oct 65-20 Jan 66,
Army Natick Labs Mass Clothing and Organic Materials Div
Douglas S. Swain. May 67, 27p
USA-NLABS-TR-67-81-CM
ARPA Order-267

Descriptors: (*Shoes, *Armed forces supplies), Thailand, Vietnam, Japan, United States, Protective clothing, Armed forces research, Wear resistance, Measurement, Anthropometry.

The report covers Phase II of work accomplished by the U. S. Army Natick Laboratories, Natick, Massachusetts under Advanced Research Project Agency (ARPA) Order No. 267, Amendment 11 on 'The Development of a Combat Boot Last for Thai and Vietnamese Military Forces.' The program was a joint venture conducted with anthropometric data on Thai and Vietnamese feet originatint at the Natick Laboratories, and preliminary tests of lasts and footwear models developed from this study by Jones and Vining, Inc., Brockton, Massachusetts. The Project Officer on this program from the Natick Laboratories, and the representative from Jones and Vining, Inc., were in Thailand and Vietnam from 24 March to 24 April, 1965 at which time they conducted fit and wear tests of combat boots manufactured over the newly-developed last. The tests showed that 99 percent of the Vietnamese/Thai military personnel could be adequately fitted using the new last with minor modifications, which were made. Models and equipment to fabricate the boots were provided to Thailand and Vietnam, U. S. Military Assistance Command. (Author)
AD-655 529 HC$3.00 MF$0.65

SOME CONSTRAINTS ON SHIPPING IN LINEAR PROGRAMMING MODELS,
Research Analysis Corp Mclean Va
Justin C. Whiton. 1967, 5p
Availability: Published in Naval Research Logistics Quarterly v14 n2 p257-60 Jun 1967.

Descriptors: (*Linear programming, Mathematical models), (*Shipping (Marine), Scheduling), Design, Management planning, Operations research, Mathematical analysis.

This note describes some constraints that may be applied to shipping models structured as linear programming problems. These constraints defining port-throughput capability have proven useful in applications of linear programming by the author and provide additional realism in problems of vessel allocation and ship design selection. Increase in model size through the use of the constraints is in general moderate. (Author)
AD-655 601 Not available from CFSTI.

A TWO-STATION STOCHASTIC INVENTORY MODEL WITH EXACT METHODS OF COMPUTING OPTIMAL POLICIES,
Wisconsin Univ Madison
Robert F. Love. 1967, 34p
Prepared in cooperation with Stanford Univ., Calif., grant NSF-GS-552, and California Univ., Berkeley. Center for Research in Management Science. Research supported in part by Ford Foundation.
Availability: Published in Naval Research Logistics Quarterly v14 n2 p185-217 Jun 1967.

Descriptors: (*Inventory, Models (Simulations)), (*Warehouses, *Logistics), Costs, Stock level control, Interactions, Replacement theory, Management engineering, Decision making, Probability, Queueing theory.

A method is presented for calculating optimal inventory levels in a two-station transactions reporting inventory system. The criterion of optimality is the minimization of expected cost. The computational properties of the model are stressed and the solution method is precise. It is shown that when the model represents a central warehouse which supplies several retail outlets, stocks carried at the central location affect the capacity of the system to handle orders. Stocks carried at the retail level affect only the size of the retail order backlog. (Author)
AD-655 611 Not available from CFSTI.

PLANET: PART II. BENCH REPAIR SIMULATOR,
Rand Corp Santa Monica Calif
Bernard J. Voosen, and Myron H. Buchanan. Apr 67, 199p Rept no. RM-4660-PR
Contract F44620-67-C-0045

Descriptors: (*Logistics, *Air Force), (*Weapon systems, *Maintenance), Aircraft, Computers, Simulation, Performance (Engineering), Programmers, Interactions, Environment, Transportation.

The computer routines, operating manual, and programmers' manual for the Bench Repair (BR) Simulator, the second of four simulation programs constituting the Planned Logistics Analysis and Evaluation Technique (PLANET). BR is designed to simulate the operations of the various repair shops on an Air Force base. Either one or many shops can be examined with a single simulation. The simulator takes as inputs the shops' operating characteristics and simulates shop operation through time. Performance is measured in terms of repair cycle time and the shops' capacity. Outputs can be used as an aid in determining the resource requirements necessary to support repair actions. The Bench Repair Simulator can be assembled to the Availability and Base Cadre (ABC) Simulator (PLANET: Part I) to examine problems encompassing all base functions: As BR simulates field level support, ABC simulates the organizational level. Together, the two models incorporate nearly every facet of maintenance and logistics at Air Force bases.
AD-655 769 HC$3.00 MF$0.65

TOTAL PACKAGE PROCUREMENT CONCEPT, SYNTHESIS OF FINDINGS.
Logistics Management Inst Washington D C
For primary bibliographic entry see Field 5A.
AD-655 814 HC$3.00 MF$0.65

MULTI-YEAR PROCUREMENT AT THE SUBCONTRACTOR LEVEL.
Logistics Management Inst Washington D C
For primary bibliographic entry see Field 5A.
AD-655 815 HC$3.00 MF$0.65

STUDY OF HULL MECHANICAL/ELECTRICAL INSTALLED EQUIPMENT STANDARDIZATION FOR COMMISSIONED SHIPS.
Logistics Management Inst Washington D C
For primary bibliographic entry see Field 13J.
AD-655 816 HC$3.00 MF$0.65

15F. Nuclear Warfare

TIME-COMPRESSION POTENTIAL OF AN EMERGENCY BLAST SHELTER PROGRAM.
Hudson Inst Inc Harmon-on-Hudson N Y
For primary bibliographic entry see Field 13M.
AD-655 519 HC$3.00 MF$0.65

METHODOLOGY FOR ASSESSING TOTAL VULNERABILITY,
Stanford Research Inst Menlo Park Calif
Francis W. Dresch, and Hazel Ellis. Aug 66, 176p

Contract OCD-PS-64-201

Descriptors: (*Vulnerability, *Systems engineering), (*Nuclear warfare, *Thermonuclear reactions), Economics, Sociology, Political science, Culture, Attitudes, Industries, Numerical analysis, Labor unions, Language, Semantics, United States government, Interactions, Input-output devices, Civil defense systems.

The study was an attempt to apply systems analysis to the study of total vulnerability. The results indicated that the systems concept could be used to generate, through an expansible sequence of check lists, many pertinent questions about the structure of our society and its intrinsic vulnerabilities. The analysis was centered on the individual as a political, social and economic agent and 23 primary institutions that interact with him and with each other. The first step was to identify as well as possible all input and output variables for the individual and the institutions, and all the sources of each input and all the destinations for each output. Execution of this step encountered many conceptual and semantic difficulties, and made it quite clear that initial hopes of investigating possible inter-relationships quantitatively were over optimistic or premature. The systems descriptions were related to the primary and secondary effects of thermonuclear attack. They were compared with more traditional descriptions of the institutions and with two simplified postattack scenarios representing the primary effects of a heavy counter force and a heavy counter industry attack. (Author)
AD-655 530 HC$3.00 MF$0.65

ATOMIC ENERGY IN AVIATION AND ROCKET TECHNOLOGY: COLLECTION OF ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
I. Kurchatov. Nov 59, 550p Rept no. MCL-392 TT-60-15474
Trans. of mono. Atomnaya Energiya v Aviatsii i Raketnoi Tekhnike, Moscow, 1959 501p.

Descriptors: (*Nuclear warfare, USSR), (*Aircraft, *Nuclear weapons), (*Guided missiles, Nuclear warfare), (*Nuclear propulsion, Nuclear warfare), Aeronautics, Nuclear energy, Engineering.

The report contains materials devoted to the development of atomic and thermonuclear weapons and their carriers, to questions of anti-atomic defense in aviation, and of the application of atomic energy in aviation and rocketry, according to data given in the foreign literature. This is a popular book with a complete and comprehensive description of the possibilities and prospects of the utilization of nuclear energy in aviation, and in the development of aviation and rocketry.
AD-655 596 HC$3.00 MF$0.65

THE FEASIBILITY OF DEVELOPING STANDARD DESCRIPTIONS OF POST-ATTACK SITUATIONS.

Final rept.,
Human Sciences Research Inc Mclean Va
Peter G. Nordlie. Jun 67, 43p Rept no. HSR-RR-67/8-Sd
Contract OCD-PS-65-29

Descriptors: (*Nuclear warfare, Problem solving), (*Nuclear explosions, Feasibility studies), (*Management planning, Recovery), Nuclear explosion damage, Economics, United States government, Military government, Civil defense systems, Population, Environment, Ecology.

The objective of the study was to evaluate the feasibility of developing a particular methodological tool to aid in conducting research on post-attack phenomenon. All such research faces the necessity of studying phenomena in hypothetical future situations. To aid in solving the many problems this fact poses, the concept was advanced of a set of standard situational cases reflecting the range of situations nuclear attacks could create. The study was initiated to determine if the concept of the standard situational case offered sufficient promise for development as a practically applicable research tool. It was concluded that development of the original concept of the standard situational case was not feasible primarily for two reasons: (1) the initial inability to provide criteria for distinguishing between relevant and irrelevant information, and (2) the failure to find means for reducing the cases to a manageable number. However, from a number of the insights gained in the course of the study, a new concept was developed different from, but aimed at the same objectives, as the standard situational case concept. This new concept followed from the realization that the definition of recovery would provide criteria for testing the relevance of information about post-attack situations. The remainder of the study was devoted to further development of this new concept of defining critical information categories for post-attack situations.
AD-655 649 HC$3.00 MF$0.65

PRELIMINARY AERIAL INFRARED FIRE MAPPING SYSTEMS ANALYSIS.
HRB-Singer Inc State College Pa
For primary bibliographic entry see Field 15G.
AD-655 685 HC$3.00 MF$0.65

15G. Operations, Strategy, and Tactics

COUNTERFORCE, DAMAGE-LIMITING, AND DETERRENCE,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 15C.
AD-655 341 Not available from CFSTI.

PRESIDENTIAL CONTROL OF FORCE: THE KOREAN WAR AND THE CUBAN MISSILE CRISIS,
Rand Corp Santa Monica Calif
Alexander L. George. Jul 67, 25p Rept no. P-3627
Prepared for presentation at Meetings of American Sociological Association, San Francisco, Calif., Aug 1967.

Descriptors: (*Limited war, North Korea), (*Warfare, Cuba), United States, USSR, Guided missiles, War games, War potential, Foreign policy, Armed forces operations, Foreign aid, Strategic warfare, Economics.

The Korean experience emphasized dramatically for all future administrations that it is the President's responsibility not merely to indicate the objectives to be pursued in a conflict, but also to set a limited ceiling on the acceptable costs and risks of pursuing those objectives. The Cuban missile crisis stands out as a case in which a small and carefully applied amount of force sufficed to secure an objective. There were extenuating circumstances that favored this. Conditions will differ from crisis to crisis. Still it is necessary to understand the conditions under which force can be employed so economically and in this case so effectively. Force, in the Cuban crisis, was used as a refined instrument of coercion and persuasion. There are bound to be severe limits to the use of force as a selective, controlled instrument of policy in future crises. But it is essential to discover these limits. Once military operations go beyond a certain point, the momentum of war can set off a chain of consequences neither fully anticipated or perfectly controlled.
AD-655 373 HC$3.00 MF$0.65

THE COMMUNIST INSURGENT INFRASTRUCTURE IN SOUTH VIETNAM: A STUDY OF ORGANIZATION AND STRATEGY, VOLUME I,
American Univ Washington D C Center for Research in Social Systems
Michael Charles Conley. Jul 67, 244p
Contract DA-49-092-ARO-7
See also AD-655 507, Volume 2.

Descriptors: (*Insurgency, Vietnam), (*Counter-insurgency, *Strategic warfare), Communists, Propaganda, Tactical warfare, Population, Communism, Military organizations, Guerrilla warfare.

An analysis of the dynamics of the Communist movement in South Vietnam presupposes a thorough grasp of organizational issues, since one is dealing here with a form of subversion that is implemented through the agencies of a highly disciplined bureaucracy, staffed in its critical offices with party members. Regarding the structure of the movement, distinctions are made among three major echelons: the party apparatus, based upon a cellularly ordered hierarchy of committees; the civil organization, embracing mass associations and the federated fronts erected over them; and the armed elements, domestically activated or infiltrated across international borders. In the light of an understanding of both the structure and functions performed by these several hierarchies, the larger issues of grand strategy and tactics, political and military, are examined. The work is completed with an investigation of the Saigon-Cholon-Gia Dinh area, in which the several factors, examined in succession in the earlier portions of the work, are integrated into a single statement. The study argues that the goal of the subversive movement is not tactical military success on the battlefield, but the progressive extension of de facto controls over the civil population, and that success in this political endeavor is dependent upon the party's ability to sustain its controls over the extra-party bodies activated. The failure to place the destruction of this organization at the center of counterinsurgent planning, consequently, would substantially vitiate such positive accomplishments of a collateral nature as might be attained. (Author)
AD-655 506 HC$3.00 MF$0.65

THE COMMUNIST INSURGENT INFRASTRUCTURE IN SOUTH VIETNAM: A STUDY OF ORGANIZATION AND STRATEGY, APPENDICES, VOLUME II,
American Univ Washington D C Center for Research in Social Systems
Michael Charles Conley. Jul 67, 360p
Contract DA-49-092-ARO-7
See also AD-655 506, Volume 1.

Descriptors: (*Insurgency, Vietnam), (*Counter-insurgency, *Strategic warfare), Communists, Propaganda, Tactical warfare, Population, Communism, Military organizations, Guerrilla warfare, Leadership.

Appendix A is an extended essay on the general subjects of Communist Party organization, inner-party practices, and the historic origins of current Communist insurgency doctrine. Appendices B through I are verbatim translations of selected captured documents of the South Vietnamese insurgents, and include the following documents: The regulations of the Communist Party and Communist Youth Organization in South Vietnam; the constitution of the Vietnam Labor Party; regulations of the Vietnamese People's Revolutionary Youth Group; the regulations of the South Vietnam Vanguard Youth; the admission procedure and self-criticism of Communist Party members; an application for admission into the party; a recommendation for admission into the party; self-critiques of party members; a list of Communist-controlled mass organizations in South Vietnam; the regulations of the National Front for the Liberation of South Vietnam; the Liberated Labor Association's Program and Statute; the By-laws of the Association of Liberated Youth of South Vietnam; a summarized program and Regulations of the Liberated Farmers' Association of South Vietnam; details of organization and propaganda indoctrination sections at various levels; ideological and political selections; a document on future propaganda and indoctrination tasks in towns; study documents for rural party members of the Dang Lao Dong; an essay on the five steps in conducting a revolution; recorded experiences in turning a village into a 'combatant village'; a NFLSVN commendation letter; a form of monthly report; and a report of the strength of the Village Liberation Youth Association. (Author)
AD-655 507 HC$3.00 MF$0.65

PRELIMINARY AERIAL INFRARED FIRE MAPPING SYSTEMS ANALYSIS.
Final rept. Feb 66-Jul 67,
HRB-Singer Inc State College Pa
Richard D. Sheeder, and Gretchen L. Duguay.
Apr 67, 82p Rept no. HRB-97711-F
Contract N00228-66-C-0394

Descriptors: (*Nuclear explosion damage, Aerial reconnaissance), (*Fires, Mapping), (*Aerial reconnaissance, *Infrared photography), Michigan, Civil defense systems, Aerial photography, Civil aviation, Mobilization, Aircraft, Airports, Damage assessment, Infrared images, Photointerpretation.

A detailed analysis of factors relevant to the infrared thermal mapping of hypothetical nuclear bursts in the state of Michigan was performed. Areas deemed critical to the recovery of the state were determined and designated to be the areas mapped in the event they were struck by a nuclear burst. A survey of civilian aircraft was performed to determine the number and distribution of those possibly available to perform the mapping flight. The total time for the mapping missions was computed for four different thermal mapping system options, and for three different levels of mapping resources. An analysis of the numerical data was performed. (Author)
AD-655 685 HC$3.00 MF$0.65

16. MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

BLACK BRANT ROCKETS AAF-III-12 AND AAF-IV-05 LAUNCHED AT CHURCHILL RESEARCH RANGE, NOVEMBER 1966.
National Research Council of Canada, Ottawa (Ontario). Space Research Facilities Branch.
Jun 67, 39p SRFB-004
Its Operations Requirement No. 212

Descriptors: *Black brant missile, *Launching, *Payload, Black brant iii missile, Configuration, Cosmic, Density, Electron, Experiment, Planning, Plasma, Probe, Range, Ray, Support, Telemetry.

For abstract, see STAR 05 17.
N67-30378 HC$3.00 MF$0.65

16B. Missile Trajectories

CAVITY SHAPES AT VERTICAL WATER ENTRY; A COMPARISON OF CALCULATED AND OBSERVED SHAPES.
Revised ed.,
Naval Ordnance Lab White Oak Md
Harvey I. Abelson. 29 Jun 67, 27p Rept no. NOLTR-67-31, Ballistics Research-171
Revision of manuscript submitted 23 Jan 67.

Descriptors: (*Guided missiles, Water entry), (*Water entry, Cavitation), Hydrodynamic configurations, Hydraulic models, Flow fields, Spheres, Mathematical models.

For vertical water entries which result in the formation of open cavities, the cavity shapes as predicted by Birkoff's hydraulic flow model are shown to correspond very well to observed cavity shapes for spheres of different sizes and materials. (Author)
AD-655 227 HC$3.00 MF$0.65

16D. Missiles

JOINT MILITARY-INDUSTRY GUIDED MISSILE RELIABILITY SYMPOSIUM (6th), VOLUME I, 15-17 FEB 1960.
Army Missile Command, Redstone Arsenal, Ala.
17 Feb 60, 450p

Descriptors: (*Guided missiles, *Reliability), (*Symposia, Guided missiles), Tactical weapons, Strategic weapons, Management planning, Quality control, Guided missile components, Electronic equipment, Checkout procedures, Test methods, Environmental tests, Human engineering, Industrial training, Statistical analysis, Acceptability, Costs, Effectiveness, Guided missiles (Surface-to-surface), Guided missiles (Surface-to-air), Management engineering, Reliability (Electronics).
Identifiers: IDEP.

Contents: Tactical reliability of field army guided missile systems; What reliability means to SAC; Interservice data exchange program (IDEP); Management policies for assigning departmental reliability responsibilities; High reliability requirements present challenge to the electronics industry; R and D engineering reliability program at Motorola's western military electronics center; The definition and determination of missile weapons systems reliability; Let's define our component reliability goals; A unique approach to reliability design reviews; Reliability education; Development of a reliability course specifically for design engineers; Increasing reliability through operator and inspector training and certification; Human factors and missile system unreliability; Personnel logistics as a factor in achieving weapon system reliability; The hidden dissuaders of missile system reliability; The demonstration of equipment reliability through accelerated life testing techniques; Bullpup, a round of ammunition; Verification of flight reliability missile guidance unit; Reliability concepts applied to obtain design specifications from measured environmental data
AD-454 674 HC$3.00

PRESIDENTIAL CONTROL OF FORCE: THE KOREAN WAR AND THE CUBAN MISSILE CRISIS,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 15G.
AD-655 373 HC$3.00 MF$0.65

PACKAGING DENSITY STUDY: ANALYSIS AND METHODS FOR 'BALL PARK' ESTIMATES OF PACKAGING EFFICIENCY,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 13D.
AD-655 417 HC$3.00 MF$0.65

ATOMIC ENERGY IN AVIATION AND ROCKET TECHNOLOGY: COLLECTION OF ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 15F.
AD-655 596 HC$3.00 MF$0.65

ANALYSIS OF STRUCTURAL RESPONSE WITH DIFFERENT FORMS OF DAMPING.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
For primary bibliographic entry see Field 20K.
For abstract, see STAR 05 17.
N67-31401 HC$3.00 MF$0.65

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

A CONTINUOUS GRADIENT RAY TRACING TECHNIQUE.
Research rept.,
Navy Underwater Sound Lab New London Conn
Henry Weinberg. 16 Jun 67, 29p Rept no. USL-829

Descriptors: (*Underwater sound, Velocity), Oceans, Test methods, Acoustics, Integrals, Curve fitting.
Identifiers: Acoustic ray tracing.

A method of computing ray paths in an ocean for which the velocity gradient varies continuously with depth was developed. The ocean is divided into several horizontal layers. In each layer the velocity-depth profile is given by a four-parameter curve that permits range and travel time integrals to be evaluated in closed form. The curve fitting and ray tracing equations can readily be incorporated into computer programs. Some of the advantages of this technique and other ray tracing methods are compared. (Author)
AD-655 617 HC$3.00 MF$0.65

RESPONSES OF ARRAYS OF ISOTROPIC ELEMENTS IN DETECTION AND TRACKING.
Research rept. Jul 66-Feb 67,
Navy Electronics Lab San Diego Calif
L. K. Arndt. 21 Apr 67, 66p Rept no. NEL-1456

Descriptors: (*Sonar arrays, Mathematical analysis), (*Detection, Sonar targets), Tracking, Transducers, Performance (Engineering), Scanning, Configuration, Analysis.

Analytical expressions of responses for linear, planar, cyclindrical, and spherical arrays are given. Additive arrays are found 'best' for detection of a point target in a uniform noise field. Split-beam multiplicative arrays are found 'best' for bearing estimates of a single point target. (Author)
AD-655 621 HC$3.00 MF$0.65

17B. Communications

THEORETICAL CALCULATION OF RF ENERGY RECEIVED FROM A TRANSMITTER BY AN ELECTROEXPLOSIVE DEVICE AND COMPUTATION OF SAFE SEPARATION DISTANCES.
Technical memo.,
Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N. J.
Dusan Georgevich. Oct 64, 22p
PA-TM-1326

Descriptors: (*Radiofrequency pulses, Radio transmitters), Radiofrequency power, Explosives initiators, Electromagnetic fields, Electric igniters, Circuits, Antennas.

An analysis is made of the relationships between the energy emmitted by radio frequency (RF) transmitters, that which is received by electroexplosive device (EED) lead wires, and the proportion of the energy which might reach the bridgewire of an EED. (Author)
AD-450 567 HC$3.00

RESEARCH ON DIELECTRICS FOR MICROWAVE ELECTRON DEVICES.
Final rept. no. 9, 1 Jul 62-30 Sep 64,
Stanford Research Inst., Menlo Park, Calif.
D. Peters, C. Pultzer, L. Feinstein, and J. Bordeaux. Nov 64, 109p
Contract DA-36-039-sc-90856, ARPA Order-318-62

Descriptors: (*Microwave equipment, *Dielectrics), (*Dielectric films, Dielectric properties), Waveguide windows, Aluminum compounds, Oxides, Electron bombardment, Transport properties, Vacuum apparatus, Thickness, Processing, Sapphires, Impurities, Temperature, Ceramic materials, Ionization, Crystal growth, Crystal lattice defects.

The purpose of this research was to study the properties of dielectrics used in microwave devices with special emphasis on materials used for microwave windows. This report reviews the results of a study of the transport and breakdown properties of aluminum oxide and of methods of growth of this dielectric from the vapor phase in an evacuated system. Growth of aluminum oxide films ranging in thickness from 1000 to 5000 angstroms by five different methods was achieved. Alpha aluminum oxide films were grown by thermal evaporation in the ultrahigh vacuum system. Data from experiments on transport in single crystal sapphire indicate that electron or hole conduction is primarily due to the effect of impurities or defects and, therefore, indicates either an impurity band or hopping process or a polaron conduction mechanism. The data from electron bombardment and breakdown studies indicate that particle bombardment, in addition to creating defects if particle energy is sufficiently high, can also lead to formation of separated charge regions in the material. These regions can act as sources of internal fields within the dielectric. (Author)
AD-455 565 HC$3.00

THE USE OF COMPUTERS IN SPEECH RESEARCH,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
J. B. Dennis. Jul 64, 14p
Contract AF 19 (604)-6102, Grant NSF-G16526
Availability: Published in Annals of the New York Academy of Sciences v115 Art2 p867-80 Jul 31 1964.

Descriptors: (*Speech, Models (Simulations)), Data processing systems, Digital computers, Acoustic filters, Speech transmission, Phonetics, Sound.

Basic speech research requires the evaluation of models of human activity which are best carried out with the help of a digital computer. Adequate communication with the machine is necessary so that the experimenter may observe trials of a model and adjust parameters for further trials on the basis of observed performance. Communication with outside equipment is necessary for data acquisition. Hybrid operation with analog equipment is an advantageous way of modeling dynami-

cal systems such as the acoustic filter of the human speech mechanism. (Author)
AD-655 206 Not available from CFSTI.

CROSSLANGUAGE STUDY OF PERCEPTUAL CONFUSION OF PLOSIVE PHONEMES IN TWO CONDITIONS OF DISTORTION,
Ohio State Univ Research Foundation Columbus
For primary bibliographic entry see Field 5G.
AD-655 319 Not available from CFSTI.

FOREIGN SCIENCE BULLETIN, VOL. 3, NO. 6, 1967.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 20E.
AD-655 339 HC$3.00 MF$0.65

EXPERIMENTAL SETUP FOR THE SYNTHESIS OF SPEECH SEGMENTS,
Foreign Technology Div Wright-Patterson AFB Ohio
L. B. Belozerova. 31 Jan 67, 25p Rept no. FTD-HT-66-469
TT-67-62355
Eksperimentalnaya Ustanovka dlya Sinteza Otrezkov Rechi, edited trans. of Akademiya Nauk Gruzinskoi SSR, Triflis. Institut Elektroniki, Avtomatiki i Telemekhaniki. Trudy, v4 n51-66 1963.

Descriptors: (* Speech, Synthesis), Machine translation, Language, Speech transmission, Reading machines, Phonetics, Intelligibility, Speech recognition, USSR.
Identifiers: Georgian language.

The report describes an experimental setup for synthesizing speech for the purpose of accumulating data on the structural make-up of the discrete units of language and of determining the technological demands made on such devices. The stream of speech at the synthesizing end of the system is regenerated under the immediate control of the portion of information abstracted from the speech of the announcer. As applied to reading and translating machines the problem of synthetic speech appears in a somewhat different form: sufficiently intelligible artificial speech must be created anew from the semantic information obtained in the reading or translation of some text. A block-diagram is given whose principal components are a sound power source, unit for forming a statistical formant spectrum, units for formant variation, automatic starter for voicing the synthesized speech segment, delay block, electronic commutator for pauses between sounds, electronic channel commutators, device for shaping the synthesized speech segment, and final amplifier. The described device synthesized separate phonemes, words, and syllables of Georgian. Videograms of synthesized speech segments and brief engineering data on the individual components of the setup are given.
AD-655 346 HC$3.00 MF$0.65

STUDIES OF DISPLAY SYMBOL LEGIBILITY. PART XVI: THE LEGIBILITY OF TELETYPEWRITER SYMBOLS ON TELEVISION,
Mitre Corp Bedford Mass
For primary bibliographic entry see Field 5E.
AD-655 356 HC$3.00 MF$0.65

INVERSE CONVOLUTION FILTERS: AN ITERATIVE TECHNIQUE,
Texas Univ Austin Dept of Electrical Engineering
For primary bibliographic entry see Field 14C.
AD-655 405 Not available from CFSTI.

TV-37 VHF AND TU-11 UHF 2000-WATT TRANSMITTERS.
Final rept.,
Collins Radio Co Cedar Rapids Iowa
C. H. Kirkpatrick, C. J. Schubert, and R. W. Grosser. Jun 67, 143p Rept no. 523-0759351-00121M FAA-RD-67-16
Contract FA-65-WA-1068

Descriptors: (* Radio transmitters, Air traffic control systems), Very high frequency, Ultrahigh frequency, Amplitude modulation, Design, Reliability (Electronics), Surface-to-air.

The design, fabrication, and testing of TV-37 and TU-11 Transmitters are discussed. The TV-37 develops 2000 watts of carrier power, is amplitude modulated, and is in the 118- to 136-megahertz band. The TU-11 develops 1500 watts of carrier power, is also amplitude modulated, and is in the 278- to 328-megahertz band. Both transmitter types use essentially the same unit with only minor changes necessary to convert from one to the other. The FAA 50-watt transmitter, type TV-36 or TU-9, is used to drive one linear class AB sub 1 stage in the TV-37 or TU-11 respectively. Safety features protect service personnel. Silicon solid-state components, where possible, along with conservative design ensure reliable operation. Interlocks and monitoring circuits reduce the chance of transmitter damage due to component failure or operator error. One set of equipment was developed to provide angle modulation for the TV-36. Considerable design and development was necessary to ensure proper cooling and electrical stability of the final amplifier stage. Extensive and inclusive testing has shown that the final design meets or exceeds all major development objectives. (Author)
AD-655 474 HC$3.00 MF$0.65

EVALUATION AND PREDICTION OF MAXIMUM USABLE FREQUENCY (MUF) OVER BANGKOK,
Stanford Research Inst Menlo Park Calif
Clifford L. Rufenach. Jan 67, 75p Rept no. SRI-Special-TR-28
Contract DA-36-039-AMC-00040 (E), ARPA Order-371

Descriptors: (* Radio transmission, Thailand), Predictions, Radiofrequency, Periodic variations, Statistical analysis, Ionospheric propagation.

Two sets of corrected monthly median MUF (vertical incidence) predictions are compared against the monthly median observed vertical incidence sounder values over Bangkok for the period April 1965 through August 1966. The comparison showed the definite improvement in accuracy that is the primary requirement for new corrected predictions for 1967. New predictions for 1967 were derived by adding a correction to values obtained from a method developed by Stanford Research Institute, long-term predictions can be prepared for several years in advance with this method. The predictions for 1967, corrected for the Bangkok area, typically vary between about 3 MHz in the early morning to about 10 MHz in the late afternoon. The predicted MUF's for 1967 average about 1 MHz higher than 1966, which means that the 1967 operating frequencies may be increased by about 1 MHz without increasing the expected communication outage. (Author)
AD-655 566 HC$3.00 MF$0.65

DEVELOPMENT OF AN OCEAN DATA STATION TELEMETERING BUOY.
General Dynamics/Convair San Diego Calif
For primary bibliographic entry see Field 8C.
AD-655 618 HC$3.00 MF$0.65

INFLUENCE OF FORMAT ON MESSAGE INFORMATION ENTROPY AND LOADING OF COMMUNICATION CHANNELS.
Navy Electronics Lab San Diego Calif
For primary bibliographic entry see Field 9D.
AD-655 622 HC$3.00 MF$0.65

WORLD MAPS OF CONJUGATE COORDINATES AND L CONTOURS,
Institute for Telecommunication Sciences and Aeronomy Boulder Colo
For primary bibliographic entry see Field 4A.
AD-655 661 Not available from CFSTI.

A BIBLIOGRAPHY OF LASER APPLICATIONS.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 20E.
AD-655 774 HC$3.00 MF$0.65

STUDIES IN DISPLAY SYMBOL LEGIBILITY. PART XVIII. THE RELATIVE LEGIBILITY OF UPPERCASE AND LOWER CASE TYPEWRITTEN WORDS,
Mitre Corp Bedford Mass
For primary bibliographic entry see Field 5E.
AD-655 798 HC$3.00 MF$0.65

EXTRATERRESTRIAL CIVILIZATIONS.
Israel Program for Scientific Translations, Ltd., Jerusalem.
For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 17.
N67-30330 HC$3.00 MF$0.65

SPACE PROGRAMS SUMMARY NO. 37-45, VOLUME III FOR THE PERIOD MARCH 1 TO APRIL 30, 1967. THE DEEP SPACE NETWORK.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
For primary bibliographic entry see Field 17G.
For abstract, see STAR 05 17.
N67-30371 HC$3.00 MF$0.65

TELECOMMUNICATIONS SATELLITES.
Institut D Aeronomie Spatiale de Belgique, Brussels.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 17.
N67-30733 HC$3.00 MF$0.65

RESEARCH ON THE UTILIZATION OF PATTERN RECOGNITION TECHNIQUES TO IDENTIFY AND CLASSIFY OBJECTS IN VIDEO DATA TECHNICAL PROGRESS REPORT, 31 JAN. - 31 MAY 1967.
Douglas Aircraft Co., Inc., Newport Beach, Calif. Astropower Lab.
R. D. Joseph. Jun 67, 36p NASA-CR-85004, SM-48464-TPR-5
Contract NAS12-30

Descriptors: * Data reduction, * Pattern recognition, * Video data, Algorithm, Data, Decision, Design, Filter, Information, Mechanism, Nonlinear, Pattern, Property, Recognition, Reduction, Statistics, Surface, Switching, Video.

For abstract, see STAR 05 17.
N67-30865 HC$3.00 MF$0.65

A STUDY OF DECISION REGION RECEIVERS FOR THE SUNBLAZER SPACE EXPERIMENT.
Massachusetts Inst. of Tech., Cambridge. Center for Space Research.
J. L. Mannos. Jun 67, 90p NASA-CR-85789, CSR-T-67-5

Descriptors: * Decision, * Receiver, * Sunblazer space probe, Analysis, Code, Communications, Delay, Noise, Performance, Ratio, Region, Signal, Space, Time.

For abstract, see STAR 05 17.
N67-30950 HC$3.00 MF$0.65

CLOSED-LOOP DOPPLER CORRECTION SCHEME.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
P. E. Oneill, Jr.. Jun 67, 46p NASA-TM-X-55829, X-733-67-282

Descriptors: * Doppler effect, * Frequency shift, * Ground station, * Satellite communication, Clock, Close, Communication, Correction, Effect, Error, Frequency, Ground, Light, Loop, Relative, Satellite, Scheme, Shift, Station, Technique, Velocity.

For abstract, see STAR 05 17.
N67-31384 HC$3.00 MF$0.65

17C. Direction Finding

THE RELATION BETWEEN SKY BRIGHTNESS AND INTERFEROMETER OUTPUT.
Research rept.,
Cornell Univ., Ithaca, N. Y.
L. Wagner. 30 Jun 60, 25p RR-RS-11
RADC-TN-60-167
Contract AF 30 (602)-2022

Descriptors: (* Sky brightness, * Interferometers), (* Direction finding signals, Effectiveness), Fourier analysis, Mathematical analysis, Measurement, Theory.
AD-244 478 HC$3.00

17E. Infrared and Ultraviolet Detection

CODED RETICLES FOR FIXED-FIELD IMAGING SYSTEMS,
Michigan Univ Ann Arbor Inst of Science and Technology
For primary bibliographic entry see Field 20F.
AD-655 502 HC$3.00 MF$0.65

17F. Magnetic Detection

ON RELATION OF MAGNETIC ANOMALIES TO THE STRUCTURE OF THE EARTH CRUST IN THE SOUTHEASTERN PART OF CENTRAL KAZAKHSTAN.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
L. I. Puchkova, and A. V. Ladynin. 1967, 15p
ACIC-TC-1193, TT-67-62344
O Svyazi Magnitnykh Anomalii so Stroyeniem Zemnoi Kory v Yugovostochnoi Chasti Tsentralnogo Kazakhstana, trans. of Geologiya i Geofizika (USSR) n12 p126-34 1965.

Descriptors: (* Magnetic anomaly detection, * Rock (Geology)), (* Sedimentary rock, Magnetic properties), Earth (Planet), Minerals, Sand, Shale, Magnetic fields, USSR.

Lately there are attempts to utilize the data of the aeromagnetic survey in the study of both the abyssal structure of the earth's crust and the structure of its upper stratified horizons. In order to explain the relations between magnetic anomalies of different orders and the structure of various horizons of the earth's crust we utilized the material of the aeromagnetic survey, geological data and the diagrams of the earth's crust constructed on the basis of geological and gravimetrical data for the southeastern part of Central Kazakhstan. Good exposure of the region makes it possible to quite reliably determine a correlation between magnetic anomalies and various geological bodies.
AD-655 698 HC$3.00 MF$0.65

INTERPRETATION OF GRAVITY AND MAGNETIC ANOMALIES PERTAINING TO VERTICAL CONTACTS OF BLOCKS OF ROCK.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
I. G. Klushin. 1967, 19p
ACIC-TC-1238, TT-67-62343
Ob Interpretatsii Gravitatsionnykh i Magnitnykh Anomalii, Priurochennykh k Vertikalnym Kontaktam Blokov Gornykh Porod, trans. of Akademiya Nauk USSR. Izvestiya. Fizika Zemli, n1 p32-41 1966.

Descriptors: (* Rock (Geology), * Magnetic anomaly detection), Density, Magnetism, Problem solving, Geophysics, Geology, Gravity, Exploration, Anomalies.

The degree of details is investigated with which the relative differentiation of blocks of rock can be determined relative to density and magnetization. A general solution of the problem is presented, which makes it possible to determine the change of excess density and magnetization of the depth function. The influence of certain factors upon the level of the indeterminate form of the solution is evaluated. Each method of exploring geophysics has a certain, most characteristic, physical model of the geological medium, important from the point of view of practical application. Both for gravitational and magnetic exploration, simplest and most efficient is the case of the vertical bedding of rocks, when the changes of physical parameters and anomalies agree especially distinctly. (Author)
AD-655 699 HC$3.00 MF$0.65

ON THE SEPARATION OF REGIONAL MAGNETIC ANOMALIES.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
B. A. Andreev, and M. S. Ryabkova. 1967, 10p
ACIC-TC-1239, TT-67-62341
O Vydelenii Regionalnykh Magnitnykh Anomalii, trans. of (16) Geologiya i Geofizika (USSR) n7 p103-5 1966.

Descriptors: (* Magnetic anomaly detection, * Geophysical prospecting), Separation, Graphics, Magnetic fields, Anomalies, Gravity, Approximation (Mathematics), Problem solving, Integration.

In many cases, during the separation of regional magnetic anomalies, especially during regional investigations, the averaging method should be given preference relative to the method of conversion to elevation. The complicated analysis systems of the anomalous field, including conversions to the upper and lower halfspaces, are expedient only with the use of the detailed data of precise large scale geophysical surveys. (Author)
AD-655 701 HC$3.00 MF$0.65

SIGNIFICANCE OF EPEIROGENETIC CURVES FOR THE INTERPRETATION OF SPACIAL DISTRIBUTION OF THE GEOMAGNETIC FIELD.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8G.
AD-655 703 HC$3.00 MF$0.65

17G. Navigation and Guidance

THE INCREASE OF THE RELIABILITY AND ACCURACY OF POTENTIOMETRIC PICKUPS OF GYROSCOPIC INSTRUMENTS,
Foreign Technology Div Wright-Patterson AFB Ohio
Z. F. Urazaev, and V. Yu. Shishmarev. 24 Apr 67, 38p Rept no. FTD-MT-65-301
TT-67-62354
Povysgenie Nadezhnosti i Tochnosti Potentsiometricheskikh Datchikov Giropriborov, Edited machine trans. of Aviatsionnyi Tekhnolicheskii Institut, Moscow. Trudy (USSR), n59 p3-4, 111-37 1964.

Descriptors: (* Potentiometers, * Gyroscopes), USSR, Reliability, Accuracy, Flight instruments, Automatic pilots.

The article briefly reviews the modern theory of instrument reliability and discusses the use of potentiometers in aircraft instruments in detail from this viewpoint. It is pointed out that the most vulnerable element in a potentiometer is the electrical contact between the potentiometer winding and the wiping contact. Contact failure is the most serious reliability problem in automatic pilot instrumentation. The design of a reliable contact is therefore discussed in detail and a few design examples are described. The possibility of increasing the reliability by providing a second parallel contact is examined and its effect on the potentiometer performance and error is illustrated by specific examples. The reasons for contact failure are discussed, and the case when two parallel contacts are used, one of which is displaced with respect to the other by either one turn or a half a turn of the potentiometer winding, is examined in detail.
AD-655 363 HC$3.00 MF$0.65

ANALYSIS OF CONTROL AND TRAFFIC IN OPERATIONAL NAS ENVIRONMENT.
Final rept.,
Franklin Inst Research Labs Philadelphia Pa
Natverbhai Amin, and Clifton E. Mayfield. May 67, 53p
FAA-RD-67-25
Contract FA-65-WA-1155

Descriptors: (* Air traffic control systems, Mathematical models), Air traffic, Aircraft, Analysis, Air traffic controllers.

Work was completed on determination of the applicability of the model to sector staffing, and simulation of control-load and airspace theory. The report summarizes the contractor's views of the model and related problems. It is based on thorough familiarity with the development and validation of the model. The model is examined in detail, improvements to it suggested, and directions pointed for its further development and evaluation; certain peripheral topics also are discussed. (Author)
AD-655 467 HC$3.00 MF$0.65

EVALUATION OF RADAR VIDEO RECORDERS.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 14C.
AD-655 635 HC$3.00 MF$0.65

COMPILATION OF REPRINTS.
Technical repts.
Oregon State Univ Corvallis Dept of Oceanography
1966, 21p Rept no. TR-83-86
Contract Nonr-1869 (09), Grant NSF-GP-2232
Availability: Published in Various journals.

Descriptors: (* Oceanology, * Pacific Ocean), Salinity, Rivers, Oregon, Sea water, pH, Hydrostatic pressure, Seacoast, Gravity, Measurement, Navigation, Loran.

Contents: Columbia River plume identification by specific alkalinity; Deep-sea pH; A magnetic survey off the Pacific northwest coast; Surface-ship gravity meter measurements corrected for vertical accelerations.
AD-655 744 Not available from CFSTI.

SPACE PROGRAMS SUMMARY NO. 37-45, VOLUME III FOR THE PERIOD MARCH 1 TO APRIL 30, 1967. THE DEEP SPACE NETWORK.

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
31 May 67, 119p NASA-CR-85298, JPL-SPS-37-45, VOL. III
Contract NAS7-100

Descriptors: *Communication system, *Deep space network (dsn), *Space navigation, *Tracking study, Antenna, Communication, Deep, Dsif, Engineering, Facility, Navigation, Network, Operation, Programming, Space, Station, Study, System, Tracking, Trajectory.

For abstract, see STAR 05 17.
N67-30371 HC$3.00 MF$0.65

RECORD OF AGARD LECTURE SERIES.
Advisory Group for Aerospace Research and Development, Paris (France).
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 17.
N67-31404 HC$3.00 MF$0.65

17H. Optical Detection

A DIGITAL LASER RANGEFINDER FOR DATA ACQUISITION,
Naval Ordnance Test Station China Lake Calif
Julian L. Thompson, and Thomas R. Stoner. 1966, 14p Rept no. NOTS-TP-4385
Availability: Published in SPIE Technical Symposium (11th) Aug 24 1966 St. Louis, Mo., p47-53.

Descriptors: (* Range finding, Lasers), Ruby, Digital systems, Optical equipment, Data, Optical tracking, Aerial targets.

The report describes the configuration of a pulsed ruby laser rangefindgr, performance goals to be attained, and some test data indicative of the degree to which these goals have been met. A more complete summary of this development appears in the paper itself. (Author)
AD-655 667 Not available from CFSTI.

A BIBLIOGRAPHY OF LASER APPLICATIONS.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 20E.
AD-655 774 HC$3.00 MF$0.65

17I. Radar Detection

FIVE-INCH HARP SYSTEM. INITIAL TEST SERIES. FORT GREELEY, ALASKA.
Technical note,
Ballistic Research Labs Aberdeen Proving Ground Md
Eugene D. Boyer, and L. Edwin Williamson. May 67, 20p Rept no. BRL-TN-1657

Descriptors: (* Meteorological radar, * Alaska), Feasibility studies, Wind, Cold weather tests, Projectiles, Captive tests, Instrumentation, Payload, Tables.
Identifiers: HARP.

The use of a 5-inch HARP system for meteorological soundings under artic conditions has been proposed. Feasibility tests for soundings to 200,000 feet (the present M33 radar limit) with present compatible payloads are discussed. (Author)
AD-655 267 HC$3.00 MF$0.65

BISTATIC SCATTERING CROSS SECTION OF A RANDOMLY-ORIENTED DIPOLE,
Massachusetts Inst of Tech Lexington Lincoln Lab
Sidney L. Borison. 26 Oct 66, 2p Rept no. JA-2931
ESD-TR-67-304
Contract AF 19 (628)-5167
Availability: Published in IEEE Transactions on Antennas and Propagation vAP-15 n2 p320-1 Mar 1967.

Descriptors: (*Radar echo areas, Scattering), Electric fields, Polarization.
Identifiers: Dipole scattering.

The bistatic radar cross section of a dipole is expressed in radar-preferred coordinates using a simple expression for the angular dependence. The spherical-random average of the cross section is computed analytically for arbitrary bistatic angle and polarizations. The expression obtained reduces to the special cases considered in the literature. (Author)
AD-655 329 Not available from CFSTI.

ELECTROMAGNETIC SCATTERING BY REGULAR POLYHEDRA.
Lockheed Missiles and Space Co Sunnyvale Calif
For primary bibliographic entry see Field 20N.
AD-655 390 HC$3.00 MF$0.65

A TECHNIQUE OF OPTIMIZING DECISION-DIRECTED CHANNEL MEASUREMENTS FOR COHERENT DETECTION,
Texas Univ Austin Dept of Electrical Engineering
William D. Gregg. 1967, 10p
AFOSR-67-1590
Grant AF-AFOSR-766-67
Availability: Published in 1967 SWIEEECO Record nF-72 p20-3-1-7 Apr 19 1967.

Descriptors: (*Radiofrequency pulses, Detection), (*Signal-to-noise ratio, *White noise), Optimization, Performance (Engineering), Convergence, Minimax technique, Digital computers, Simulation, Channel selectors, Radar tracking, Coherent radar, Asymptotic series, Measuring devices (Electrical + electronic).

The paper contains a formal optimization of the decision-direction channel measurement concept and a comparison of receiver performance characteristics with those of a uniformly weighted decision-directed measurement system. The optimization is obtained by minimizing a measure of the dispersion of the decision-directed estimation with a constraint compromise maximizing the convergence rate. The technique is applied to the bi-polar signalling case in additive, white, Gaussian noise. A study of receiver performance characteristics, via digital computer simulation, indicates measurement convergence rates and asymptotic performance superior to the uniformly weighted system over the entire range of signal-to-noise ratio investigated. The principal conclusion of this study is that discriminantly selected weighting, according to the optimality criteria developed, in decision-directed measurement, yields a significant improvement over a uniformly weighted system on the basis of the results for the signal-to-noise ratio range investigated. The significance of this result is the attainment of a less noisy reference in shorter time resulting in nearer coherent asymptotic performance relative to the uniformly weighted system.
AD-655 407 Not available from CFSTI.

THE INVERSE DIFFRACTION PROBLEM: ANALYSIS OF SPECULARS,
Mitre Corp Bedford Mass
R. M. Lewis. Jun 67, 18p Rept no. MTR-252
ESD-TR-67-91
Contract AF 19 (628)-5165

Descriptors: (*Radar echo areas, Geometry), Radar targets, Surfaces, Scattering, Radar reflections, Analysis.

Specular returns from radar targets contain large power which makes a technique based on the analysis of speculars attractive. Herein, the specular returns from a flat region and from a smooth surface tangent to a plane along a curve, which are the largest returns for reasonably sized bodies, are used to obtain information about the geometry of the target. (Author)
AD-655 797 HC$3.00 MF$0.65

DESIGN AND FABRICATION OF RADOME EROSION PROTECTION SHOES FOR F-4, A-7A AND F-111B.
Interim engineering rept. 25 May 66-25 Jan 67.
Goodrich (B.F.) Aerospace and Defense Products, Akron, Ohio.
D. D. Ewing. Jan 67, 20p 67-04-016
Contract NOw-66-0474

Descriptors: (*Radomes, Erosion), Design, Inhibition, Adhesives, Colors, Effectiveness, Aircraft, Configuration, Aerodynamic heating, Elastomers, Physical properties, Synthetic rubber, Installation, Compatibility, Dielectric properties, Protective coverings, Wear resistance, Jet fighters, Jet bombers, Attack bombers, Coatings.
Identifiers: Radome erosion shoes, F-4 aircraft, A-7 aircraft, F-111 aircraft.

Tentative aircraft radome protection requirements have been established. Selection and screening of erosion resistant materials is in process. Final evaluation testing is in process on several promising black materials. White colored materials evaluated to date do not exhibit the same degree of erosion resistance as do the dark colored ones and it has been decided to evaluate several additional white or near white materials. Materials tested are described in this report and significant test results are included. Some dielectric testing has been completed at B. F. Goodrich. This testing is in process of verification at the Radome Laboratory, Naval Air Development Center, Johnsville, Pennsylvania. Additional dielectric test samples are in process of fabrication. Tooling design for the three aircraft configurations is complete. Radome erosion shoe building forms for the F-4 and F-111B are on hand and in process of check out. The building form for the A-7A erosion shoes is in process of fabrication. (Author)
AD-814 727 HC$3.00 MF$0.65

THE DETECTION OF MODULATED GAUSSIAN SIGNALS WITH APPLICATION TO THE SIMULATION OF CW RADAR RECEIVERS.
Weapons Research Establishment, Salisbury (Australia).
For primary bibliographic entry see Field 9D.
For abstract, see STAR 05 17.
N67-30679 HC$3.00 MF$0.65

THE OVERALL FALSE ALARM PROBABILITY FOR A RADAR SEARCHING OVER A WIDE INTERVAL OF RANGE.
Royal Aircraft Establishment, Farnborough (England).
O. W. James. Dec 66, 33p RAE-TR-66405

Descriptors: *Probability theory, *Radar scanning, *Target recognition, Alarm, Echo, Error, Integration, Probability, Radar, Range, Rayleigh fading, Recognition, Scanning, Signal, Target, Theory.

For abstract, see STAR 05 17.
N67-31168 HC$3.00 MF$0.65

17J. Seismic Detection

LASA SIGNAL PROCESSING, SIMULATION, AND COMMUNICATIONS STUDY.
Final rept. Feb 66-Jan 67.
IBM Federal Systems Div Gaithersburg Md
Mar 67, 384p

ESD-TR-66-635
Contract AF 19(628)-5948

Descriptors: (*Seismic waves, Data processing systems), (*Nuclear explosions, Detection), Simulation, Communication systems, Seismometers, Computer programs.
Identifiers: LASA.

A summary of findings correlates the results with factual detail reported earlier. Signal processing is discussed; further system and simulation studies are reported; suggested system implementation is extended; and the set of simulation programs used in the study is described. (Author)
AD-655 802 HC$3.00 MF$0.65

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

METHODOLOGY FOR ASSESSING TOTAL VULNERABILITY,
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 15F.
AD-655 530 HC$3.00 MF$0.65

18B. Isotopes

THE DELTA K EQUALS 1, E1 TRANSITIONS IN ODD- A ISOTOPES OF TB AND EU.
Aktiebolaget Atomenergi, Studsvik (Sweden).
S. G. Malmskog, A. Marelius, and S. Wahlborn.
Apr 67, 28p AE-275
Submitted for Publication

Descriptors: *Electron transition, *Europium, *Terbium, Bibliography, Coriolis effect, Correlation, Coupling, Dipole, Electron, Energy, Isotope, Level, Lifetime, Measurement, Pair, Radioactivity, Spectrometer, Transition.

For abstract, see STAR 05 17.
N67-30521 HC$3.00 MF$0.65

ON THE MAGNETIC PROPERTIES OF THE K EQUALS 1 ROTATIONAL BAND IN 188 RE.
Aktiebolaget Atomenergi, Stockholm (Sweden).
M. Hoejeberg, and S. G. Malmskog. May 67, 13p AE-280

Descriptors: *Electric property, *Magnetic property, *Rhenium, *Transition probability, Band, Coincidence, Decay, Detector, Electric, Excitation, Gamma, Germanium, Half-life, Level, Magnetic, Nucleus, Osmium, Probability, Property, Radioactivity, Ray, Rotation, Spectrometer, Transition.

For abstract, see STAR 05 17.
N67-30543 HC$3.00 MF$0.65

ON THE D5/2 REVERSIBLE REACTION G7/2 TRANSITIONS IN ODD MASS PM NUCLEI.
Aktiebolaget Atomenergi, Stockholm (Sweden).
A. Baecklin, and S. G. Malmskog. May 67, 16p AE-278

Descriptors: *Forbidden transition, *Nucleus, *Promethium, Coincidence, Delay, Dipole, Energy, Excitation, Forbidden, Ground, Half-life, Isotope, Level, Magnetic, Mass, Measurement, Nuclear, Prediction, Probability, Spectrometer, State, Theory, Transition, Transition probability.

For abstract, see STAR 05 17.
N67-30753 HC$3.00 MF$.065

PURIFICATION OF A SN121M SOURCE.
Soreq Research Establishment, Israel Atomic Energy Commission, Yavneh.
B. Locker. Oct 65, 12p IA-1058

Descriptors: *Anion, *Purification, *Tin, Beta, Cesium, Decontamination, Exchange, Gamma, Indium, Lead, Oxide, Spectrum, Tellurium, Zinc.

For abstract, see STAR 05 17.
N67-31156 HC$3.00 MF$0.65

THE PRODUCTION AND USE OF MONOISOTOPIC ION BEAMS IN AN ELECTROMAGNETIC ISOTOPE SEPARATOR.
Osterreichische Studiengesellschaft Fur Atomenergie G.M.B.H., Seibersdorf (Austria).
E. Formann, F. P. Viehboeck, and H. Wotke.
1966, 13p SGAE-PH-51/1967
Presented At the Conf. on Energy Beams and Their Uses, Toronto, Sep. 1966

Descriptors: *Electromagnetic instrument, *Ion beam, *Radioactive isotope, *Separator, Beam, Collector, Dispersion, Electrode, Electromagnetic, Enrichment, Extraction, Focusing, Instrument, Ion, Isotope, Mass, Potential, Production, Radioactivity, Source, Stability, Thermal.

For abstract, see STAR 05 17.
N67-31453 HC$3.00 MF$0.65

18C. Nuclear Explosions

THE FEASIBILITY OF DEVELOPING STANDARD DESCRIPTIONS OF POST-ATTACK SITUATIONS.
Human Sciences Research Inc Mclean Va
For primary bibliographic entry see Field 15F.
AD-655 649 HC$3.00 MF$0.65

18D. Nuclear Instrumentation

RADIATION BELTS OF THE EARTH USING SOVIET EARTH SATELLITE AND COSMIC ROCKETS 1957-1959,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 4A.
AD-655 364 HC$3.00 MF$0.65

SEMICONDUCTOR DETECTOR AS A FAST NEUTRON SPECTROMETER,
California Inst of Tech Pasadena
R. G. Miller, and R. W. Kavanagh. 1 Jul 66, 16p
Contract Nonr-220 (47)
Availability: Published in Nuclear Instruments and Methods v48 n1 p13-27 1967.

Descriptors: (*Nuclear radiation spectrometers, Semiconductor devices), (*Semiconductor devices, *Neutron detectors), Silicon, Neutron reactions, Alpha decay, Protons, Recoil atoms, Aluminum, Magnesium, Nuclear spectroscopy, Instrumentation, Neutron cross sections.

Silicon semiconductor detectors were used to measure the energies of 6 to 17-MeV neutrons to a precision of 5 to 15 keV by utilizing (n, alpha) and (n,p) nuclear reactions in the active volumes of the detectors. Criteria for the selection and use of a detector are given. Various combinations of cross sections for the most important detection processes, 28Si (n, alpha)25Mg and 28Si (n,p)28Al, are presented for reactions leading to the first four states of both residual nuclei for neutron energies from 7.2 to 16.4 MeV, facilitating the use of the detector for determination of neutron flux. Resolution and pulse-height anomalies associated with the recoil 25Mg and 28Al ions are described. Methods of data analysis are discussed. (Author)
AD-655 499 Not available from CFSTI.

NEUTRON SPECTRAL MEASUREMENTS BY MAGNETIC ANALYSIS OF RECOIL PROTONS.
Memorandum rept.,
Ball Brothers Research Corp Boulder Colo
C. M. Cialella, J. M. Connor, and C. W. Hoffman.
May 67, 36p Rept no. BRL-MR-1841
Research sponsored in part by DASA.

Descriptors: (*Research reactors, *Neutron spectrum), (*Nuclear radiation spectrometers, Design), Protons, Nuclear spectroscopy, Magnetic fields, Neutron beams, Neutron reactions.
Identifiers: TRIGA reactors.

The spectral distribution of neutrons from the TRIGA Mark F Reactor at the U.S. Army Harry Diamond Laboratories was measured with a magnetic neutron spectrometer. This instrument is a broad range, low deflection spectrometer which utilizes the magnetic analysis of protons recoiling from a thin polyethylene radiator. The spectrometer will cover an energy range from 0.5 to 17 MeV with a single magnetic field setting. The spectrometer has an array of 40 solid-state detectors placed along the focal line and includes the associated electronics. This provides the instrument with the capability of measuring the entire spectrum from either pulsed or steady state sources. Measurements of the neutron spectrum with the reactor in the steady state mode were made using four radiators of different thicknesses. Measurements were made of the power output of the reactor in the pulse mode. The width of the reactor pulse was measured to be 11.0 ms (full width at half maximum). (Author)
AD-655 581 HC$3.00 MF$0.65

THE FABRICATION AND USE OF HIGH RESOLUTION LITHIUM-DRIFTED GERMANIUM GAMMA-RAY DETECTORS,
Naval Radiological Defense Lab San Francisco Calif
John P. Hurley, James M. Mathiesen, and Victor L. DaGragnano. 31 Jul 67, 33p Rept no. USNRDL-TR-67-55

Descriptors: (*Semiconductor devices, Gamma counters), (*Gamma counters, Performance (Engineering)), (*Nuclear radiation spectrometers, Semiconductor devices), Germanium, Impurities, Lithium, Nuclear energy levels, Thermal radiation, Resolution.

Experiments designed to study the behavior of various Ge (Li) detector systems are described. Techniques of improving energy resolution are discussed. Measurements of detector response to thermal radiation are described. A series of measurements showing the variation of line width as a function of energy is discussed. Finally, the appearance of anomolous peaks in the pulse height spectra is described. (Author)
AD-655 624 HC$3.00 MF$0.65

RECENT IMPROVEMENTS IN HELIUM-3 SOLID STATE NEUTRON SPECTROMETRY,
Ballistic Research Labs Aberdeen Proving Ground Md
Thomas R. Jeter, and Max X. Kennison. Jun 67, 11p Rept no. BRL-1368
Presented at the Nuclear Science Symposium (13th), Instrumentation in Space and Laboratory, Boston, Massachusetts, October 19-21, 1966.
Availability: Published in IEEE Transactions on Nuclear Science p422-7 Feb 1967.

Descriptors: (*Neutron spectrum, Measurement), (*Nuclear radiation spectrometers, Design), (*Semiconductor devices, Nuclear radiation spectrometers), Neutron counters, Helium, Dosimeters, Performance (Engineering).

A Helium-3 semiconductor neutron spectrometer with enhanced efficiency and a useful energy range to 20 MeV is described. The efficiency has been increased 2.5 on orders of magnitude over that previously attainable with only a small loss in resolution. Characteristics are presented along with typical monoenergetic and complex neutron spectra. (Author)
AD-655 831 Not available from CFSTI.

THE AMPLIFIER-DISCRIMINATOR DESIGNED FOR THE NM-64 NEUTRON MONITOR.
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
J. F. Steljes. Mar 67, 14p AECL-2680, CRGP-1254

Descriptors: *Amplifier design, *Neutron counter, *Temperature effect, Amplifier, Boron, Circuit, Collector, Design, Discriminator, Effect, Feedback, Gain, Leakage, Loop, Monitor, Sensitivity, Temperature, Transistor, Trifluoride, Voltage.

For abstract, see STAR 05 17.
N67-30867 HC$3.00 MF$0.65

18F. Radiation Shielding and Protection

A METHOD FOR CALCULATING SECONDARY GAMMA RAY TRANSMISSION THROUGH SINGLE-MATERIAL SLABS,
Ballistic Research Labs., Aberdeen Proving Ground, Md.
Alfred J. Budka. Apr 65, 29p BRL-1284

Descriptors: (*Shielding, Transport properties), (*Gamma rays, Transport properties), Wave transmission, Photons, Penetration, Secondary emission, Gamma-ray scattering, Numerical analysis.

A method is presented for calculating gamma ray transmission data for any depth distribution of secondary gamma radiation in plane single-material slabs. The method utilizes a weighting scheme and appropriate monoenergetic secondary gamma ray transmission data. The weighting scheme is based on a polynomial description of secondary gamma ray source strength as a function of slab depth. (Author)
AD-469 654 HC$3.00 MF$0.65

EXPERIMENTAL DATA OF GAMMA-RAY PENETRATION INTO THE COMPARTMENTS OF A LIGHT AIRCRAFT CARRIER.
Research and development technical rept.,
Naval Radiological Defense Lab San Francisco Calif
S. Tomoeda, M. B. Hastings, and W. G. Miller.
6 Apr 60, 120p Rept no. USNRDL-TR-412
See also AD-225 066.

Descriptors: (*Aircraft carriers, *Radiological contamination), (*Shielding, Aircraft carriers), Gamma rays, Penetration, Radioactive fallout, Cobalt, Cesium, Iridium, Ship structural components, Flight decks.

The penetration of gamma rays into compartments of an aircraft carrier from three different radioisotopes was measured. Co60, Cs137 and Ir192 sources were exposed on the Flight Deck and dosimeters were used to measure dose in two general areas of the ship at three different deck levels. Data of dose distribution are presented for the three sources used and for the different source points considered. Diagrams indicating source positions, detector positions, deck and compartment wall thicknesses and main structural member specifications are also presented. (Author)
AD-655 426 HC$3.00 MF$0.65

PROBLEMS IN REACTOR SHIELDING PHYSICS - COLLECTION OF ARTICLES.
National Aeronautics and Space Administration, Washington, D. C.
D. L. Broder, V. V. Orlov, S. G. Tsypin, A. P. Veselkin, and YU. A. Yegorov. Jun 67, 561p
NASA-TT-F-411
Transl. Into English of "vopr. Fiz. Zashchit. Reaktorov. Sb. Statey "moscow, 1963

Descriptors: *Nuclear shielding, *Radiation protection, *Reactor, *U.S.S.R., Analysis, Attenuation, Computation, Experiment, Fast, Flux, Gamma, Material, Measurement, Neutron, Nuclear, Penetration, Protection, Radiation, Shielding, Slow, Source, Theoretical.

For abstract, see STAR 05 17.
N67-31241 HC$3.00 MF$0.65

18H. Radioactivity

THEORETICAL AND EXPERIMENTAL STUDIES CONCERNING RADIATION DAMAGE IN SELECTED COMPOUND SEMICONDUCTORS.
Battelle Memorial Inst., Columbus, Ohio.
For primary bibliographic entry see Field 20L.
AD-219 228 HC$3.00

DEVELOPMENT OF DESIGN CRITERIA FOR ROOF WASHDOWN SYSTEMS: A STUDY OF THE RELATIONSHIP OF SLOPE TO PARTICLE TRANSPORT BY WATER FILMS,
Naval Radiological Defense Lab., San Francisco, Calif.
For primary bibliographic entry see Field 20D.
AD-464 189 HC$3.00

TIME-COMPRESSION POTENTIAL OF AN EMERGENCY BLAST SHELTER PROGRAM.
Hudson Inst Inc Harmon-on-Hudson N Y
For primary bibliographic entry see Field 13M.
AD-655 519 HC$3.00 MF$0.65

18I. Reactor Engineering and Operation

HEAT TRANSFER AND FLUID FLOW CHARACTERISTICS IN A PRESSURIZED WATER REACTOR QUARTERLY PROGRESS REPORT, 1 JUL. - 1 OCT. 1966.
Technische Hogeschool, Eindhoven (Netherlands).
Dec 66, 19p EURAEC-1770, EUR-3320
Contract EURATOM-011-64-1-TEEN (RD)

Descriptors: *Heat transfer, *Liquid flow, *Pressurized water reactor, Burnout, Channel, Computer program, Flow, Gamma ray beam, Heat, Hydraulics, Impedance, Liquid, Pressure, Reactor, Rod, Shroud, Transfer, Water.

For abstract, see STAR 05 17.
N67-30237 HC$3.00 MF$0.65

STUDIES ON CYCLONES FOR STEAM SEPARATION IN BOILING WATER REACTORS QUARTERLY REPORT, 1 JUL. - 30 SEP. 1966.
Aeg-kernenergieanlagen, Frankfurt Am Main (West Germany).
Brunswick, Schueler, and Tischer. 30 Sep 66, 54p EURAEC-1734, EUR-3303
Contract EURATOM-083-66-1 TEED

Descriptors: *Boiling water reactor, *Cyclone, *Separation, Axial, Boiling, Bubble, Inflow, Measurement, Reactor, Steam, Water.

For abstract, see STAR 05 17.
N67-30244 HC$3.00 MF$0.65

CRITICAL INVESTIGATION ON STEADY BURNOUT PROGRESS LETTER 1.
Applicazioni E Ricerche Scientifiche, Milan (Italy).
12 Apr 66, 7p EURAEC-1618, EUR-2831
Contract EURATOM-073-65-11-TEEI

Descriptors: *Burnout, *Reactor fuel, *Steam, Balance, Computer, Flux, Fuel, Heat, Line, Parameter, Program, Reactor, Saturation, Steady, Water.

For abstract, see STAR 05 17.
N67-31157 HC$3.00 MF$0.65

18J. Reactor Materials

POSTIRRADIATION EXAMINATION OF THE PM-3A TYPE 1 SERIAL 2 CORE. PART I. POSTIRRADIATION EXAMINATION OF FUEL TUBES.
Interim rept.,
Battelle Memorial Inst Columbus Ohio Columbus Labs
John B. Brown, Victor W. Storhok, and John E. Gates. 28 Feb 67, 88p
Contract NBy-63910

Descriptors: (*Power reactors, Reactor cores), (*Reactor cores, Malfunctions), (*Reactor fuel elements, Malfunctions), (*Reactor fuel elements, Stress corrosion), Pressurized water reactors, Reactor coolants, Radiological contamination, Steel, Cracks, Failure (Mechanics).
Identifiers: Army reactors (PM-3A).

The PM-3A Type 1 Serial 2 core was removed from the reactor because of increasing fission product levels in the primary coolant. This increase in level was believed associated with defects in the 347 stainless steel fuel cladding. This examination was to locate defects and determine their cause. Cracks were found to penetrate the outer clad of the tubular elements in high-performance regions. All cracks were longitudinal and intergranular, generally starting at the outer tube surface and terminating at a fuel particle. No evidence of grain boundary precipitates or fuel matrix cracking was observed. On the basis of crack morphology and the similarity of the cracks to cracks attributed to stress-activated corrosion by other investigators, it was concluded that the most probable cause of clad cracking was a stress accelerated chemical attack of unknown origin. (Author)
AD-655 290 HC$3.00 MF$0.65

NUCLEAR SCIENCE AND TECHNOLOGY FOR CERAMISTS.
National Bureau of Standards, Washington, D. C.
For primary bibliographic entry see Field 11B.
NBS-Misc-Pub-285 HC$1.75 MF$0.65

PREPARATION OF URANIUM CARBIDE RODS 5.5 PERCENT ENRICHED FINAL REPORT, 15 NOV. 1963 - 31 MAR. 1965.
Herstellung Von Urankarbid, 5,5 Percent Anreicherung Abschlussbericht 15.11.1963- 31.3.1965
Nuklear-chemie Und -metallurgie, G.M.B.H., Wolfgang Bei Hanau (West Germany).
P. Himmelstein, F. Ploeger, L. Schaefer, and H. Vietzke. May 67, 14p EUR-3467.D
Contract EURATOM-038-61-9-ORGD
in German, English Summary

Descriptors: *Fuel element, *Oxide, *Uranium carbide, Arc, Carbide, Casting, Compression, Element, Enrichment, Fuel, Furnace, Graphite, Hexafluoride, Irradiation, Melting, Nuclear, Pellet, Powder, Preparation, Purity, Rod, Transformation, Uranium, Uranium 235.

For abstract, see STAR 05 17.
N67-30445 HC$3.00 MF$0.65

IMPROVEMENT OF REACTOR FUEL ELEMENT HEAT TRANSFER BY SURFACE ROUGHNESS.
Aktiebolaget Atomenergi, Stockholm (Sweden).
B. Kjellstroem, and A. E. Larsson. Apr 67, 96p
AE-271

Descriptors: *Heat transfer, *Reactor fuel, *Surface roughness, Bibliography, Cluster, Element, Friction, Fuel, Geometry, Reactor, Rod, Roughness, Smoothness, Stanton number, Surface, Test.

For abstract, see STAR 05 17.
N67-30519 HC$3.00 MF$0.65

TUNGSTEN RESONANCE INTEGRALS AND DOPPLER COEFFICIENTS FINAL REPORT.
Atomics International, Canoga Park, Calif.
S. G. Carpenter, J. M. Otter, R. K. Paschall, and H. N. Royden. 30 Jun 67, 83p NASA-CR-72229, AI-67-93
Contract NAS3-7892

Descriptors: *Doppler effect, *Resonance, *Temperature effect, *Tungsten, Axial, Coefficient, Composition, Effect, Flux, Geometry, Gold, High temperature, Integral, Isotope, Sample, Spectrum, Temperature.

For abstract, see STAR 05 17.
N67-30739 HC$3.00 MF$0.65

CRITICAL INVESTIGATION ON STEADY BURNOUT PROGRESS LETTER 1.
Applicazioni E Ricerche Scientifiche, Milan (Italy).
For primary bibliographic entry see Field 18I.
For abstract, see STAR 05 17.
N67-31157 HC$3.00 MF$0.65

18K. Reactor Physics

PU241 CROSS-SECTIONS BELOW 1 KE V.
Atomic Energy Establishment, Winfrith (England). General Reactor Physics Div.
For primary bibliographic entry see Field 20H.
For abstract, see STAR 05 17.
N67-30300 HC$3.00 MF$0.65

POLARIZED ELASTIC FAST-NEUTRON SCATTERING OFF 12 C IN THE LOWER ME V-RANGE. I - EXPERIMENTAL PART.
Aktiebolaget Atomenergi, Stockholm (Sweden).
For primary bibliographic entry see Field 20H.
For abstract, see STAR 05 17.
N67-30520 HC$3.00 MF$0.65

CALCULATIONS OF NEUTRON FLUX DISTRIBUTIONS BY MEANS OF INTEGRAL TRANSPORT METHODS.
Aktiebolaget Atomenergi, Stockholm (Sweden).
I. Carlvik. May 67, 95p AE-279

Descriptors: *Geometry, *Neutron flux, *Transport equation, Anisotropy, Calculation, Cell, Circular, Cluster, Collision, Dimensional, Discrete, Distribution, Equation, Flux, Integral, Integration, Kernel, Method, Neutron, Nuclear, One, Plane, Probability, Rectangle, Scattering, Spherical, Transport.

For abstract, see STAR 05 17.
N67-30522 HC$3.00 MF$0.65

18L. Reactors (Power)

POSTIRRADIATION EXAMINATION OF THE PM-3A TYPE 1 SERIAL 2 CORE. PART I. POSTIRRADIATION EXAMINATION OF FUEL TUBES.
Battelle Memorial Inst Columbus Ohio Columbus Labs
For primary bibliographic entry see Field 18J.
AD-655 290 HC$3.00 MF$0.65

THERMAL STUDY OF THE POWER INCREASE IN SILOE.
Etude Thermique de l'Augmentation de Puissance de Siloe
Commissariat A L Energie Atomique, Grenoble (France). Centre D'etudes Nucleaires.
F. Merchie. 7 Dec 65, 57p NP-16497
in French

Descriptors: *Fuel element, *Thermal power, Calculation, Condition, Element, Fuel, Operation, Plate, Power, Rod, Silo, Thermal.

For abstract, see STAR 05 17.
N67-31072 HC$3.00 MF$0.65

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

ACTION OF EXPLOSIVES ON METALS USED IN AMMUNITION.
Technical rept.,
Picatinny Arsenal Dover N J
L. H. Eriksen. 24 Jan 45, 16p Rept no. PA-TR-1493

Descriptors: (*Explosive materials, Compatibility), (*Ammunition components, Compatibility), Copper, Brass, Aluminum, Stainless steel, Steel, Coatings, Metal coatings, Magnesium, Magnesium alloys, Aluminum alloys, PETN, Pentolite, RDX, TNT, Azides, Corrosion.
Identifiers: Amatol, Ednatol, Haleite, Leat azide, Tetrytol.

An examination was made of the metal strips of copper, brass, aluminum, stainless steel, mild steel, mild steel coated with acid-proof black paint and mild steel plated with copper, cadmium, nickel and zinc after storage for two years at atmospheric temperature and 50C. in contact with the explosives PETN, 50/50 Pentolite, Haleite, 60/40 Ednatol, 75/25 Tetrytol and RDX Compositions A and B, both dry and containing approximately 0.5 percent moisture. After two years of continuous storage, the dry explosives had little or no effect on any of the metals. The action of the moist explosives on these same metals varied from a light to a heavy tarnishing effect with the exception of moist Haleite and 60/40 Ednatol, which had a decidedly heavier corrosive action on all metals except stainless steel. Stainless steel and aluminum appear to be the most corrosion-resistant of the metals considered. The report also contains the results of similar tests made using magnesium metal and a magnesium-aluminum alloy, J-1. It is considered that both are also satisfactory for use in ammunition components with all the explosives tested except Amatol.
AD-655 282 HC$3.00 MF$0.65

A PRELIMINARY INVESTIGATION OF SAFETY AND ARMING DEVICES FOR LOW VELOCITY PROJECTILES,
City Coll New York
Gerard G. Lowen. 1 Mar 66, 85p
Research supported in part by Harry Diamond Labs., Washington, D. C. See also AD-655 289.

Descriptors: (*Arming devices, *Mortar ammunition), (*Safety devices, *Projectiles), Analysis, Velocity, Fuze functioning elements, Equations of motion, Acceleration, Differential equations, Systems engineering.

The basic principles of several mechanisms for use as safety and arming devices for low velocity projectiles are discussed. Specific emphasis is placed on the need for a mechanism to be capable of distinguishing between the acceleration-time histories caused by the mortar firing of a projectile and those resulting from the accidental impact of the projectile due to delivery by a malfunctioning parachute. Existing and suggested devices, which are supposed to measure a crucial velocity change, are categorized and examined. Preliminary recommendations concerning the most promising approaches are given. (Author)
AD-655 286 HC$3.00 MF$0.65

BASIC STUDY OF THEORY OF SAFETY AND ARMING DEVICES FOR LOW VELOCITY PROJECTILES,
City Coll New York
Gerard G. Lowen. 1 Jun 67, 279p
Contract DA-49-186-AMC-387 (D)
See also AD-655 286.

Descriptors: (*Arming devices, *Mortar ammunition), (*Safety devices, *Projectiles), Theory, Velocity, Fuze functioning elements, Acceleration, Equations of motion, Differential equations, Systems engineering.

Four different systems are shown to be capable, within certain limitations, of distinguishing between acceleration pulses caused by 1-increment mortar firings (delta V > 270 fps.) and those resulting from the accidental impact of the projectile due to delivery by a malfunctioned parachute (delta V < 270 fps.). All of these systems sense velocity change, and depend on the difference between the two conditions to achieve handling safety. The systems are compared and recommendations for further investigation are given. (Author)
AD-655 289 HC$3.00 MF$0.65

EVALUATION OF PROCESSES OCCURRING IN PYROTECHNIC FLAMES.
Final progress rept. Feb 66-Feb 67,
Denver Research Inst Colo
Robert M. Blunt. 15 Mar 67, 84p Rept no. DRI-880-6703-F
NAD-CR-RDTR-91
Contract N164-11171

Descriptors: (*Pyrotechnics, Spectra (Visible + ultraviolet)), (*Flames, Pyrotechnics), Fuels, Magnesium, Calcium, Continuous spectrum, Sodium, Flares, Sodium compounds, Calcium compounds, Nitrates.
Identifiers: Calcium nitrate, Sodium nitrate.

Spectroscopic studies of the radiation emitted in the visible region by pyrotechnic compositions containing magnesium and calcium as fuels were made. The species present were identified and data on the dominant wavelength and purity of the radiation from the flames are presented. Spectroscopic techniques which were used to determine the flame temperatures did not produce useful results. The reason for the sodium continuum is discussed and it is compared to the continuum found in the radiation from high pressure mercury discharge tubes. A resume of the important papers published since about 1900 on sodium spectra is given. A bibliography of these papers is provided. The change in the intensity of the visible radiation from magnesium-sodium nitrate flares is compared with the change for calcium-calcium nitrate and magnesium-calcium nitrate as the ambient pressure is reduced. It was noted that anhydrous calcium nitrate can be mixed with calcium metal and pressed into flare candles, but the hydrated nitrate cannot be used satisfactorily. A red shift in dominant wavelength which is associated with in-

creased magnesium content was noted and partially explained. (Author)
AD-655 820 HC$3.00 MF$0.65

BINDER STUDY - VISUAL CAST FLARES.
Final summary rept.,
Ordnance Research Inc Fort Walton Beach Fla
H. R. Waite, and Y. Arikawa. Mar 67, 24p
NAD-CR-RDTR-92
Contract N00164-67-C-0086

Descriptors: (*Flares, *Binders), Acrylic resins, Vinyl plastics, Casting, Sodium compounds, Nitrates, Perchlorates, Magnesium, Effectiveness.
Identifiers: Sodium perchlorate.

Techniques and castable formulations were developed that produce luminous efficiencies between 42,000 and 45,000 candle-seconds/gram; no diameter effect was apparent in the range of 1.5 to 4.95 inches. The early experimental effort on the use of compounded polyesters and urethanes was discontinued in favor of the use of glycidyl methacrylate and similar vinyl monomers. This class of monomer gives the desired solvation of the perchlorate (with concomitant increase in viscosity of the binder for improved particle wetting) and a controlled exotherm in large diameter castings. Final physical properties are attained after 24-hour post-cure. The use of sodium perchlorate in lieu of the insoluble sodium nitrate yielded a casting slurry of lower viscosity at constant binder percentage; the use of sodium nitrate was therefore discontinued. The use of a trimodal distribution of magnesium improved casting ease at the 15 percent binder level. Early program effort concentrated on the use of kraft paper cases in order to simulate standard flare hardware. The recognized 'tunnel effect' reduced the luminance values obtained and masked differences attributable to the binder type and content. Composition efficiencies were then obtained on free standing grains, displacement cast and the cylindrical surfaces inhibited. The program demonstrated the feasibility of cast illuminating flares based on commercial materials. (Author)
AD-655 821 HC$3.00 MF$0.65

19C. Combat Vehicles

PILOT STUDY OF RIVER FREQUENCY.
Detroit Univ Mich Dept of Civil Engineering
For primary bibliographic entry see Field 13B.
AD-655 269 HC$3.00 MF$0.65

DUST EXPOSURE IN ARMORED VEHICLES.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 5E.
AD-655 574 HC$3.00 MF$0.65

19D. Explosions, Ballistics, and Armor

THE RESISTANCE OF MATERIALS TO FRACTURE PROPAGATION AND GUNFIRE DAMAGE.
Memorandum rept.,
Naval Research Lab Washington D C
Joseph A. Kies. May 56, 34p Rept no. NRL-MR-594

Descriptors: (*Materials, Toughness), Crack propagation, Fracture (Mechanics), Damage, Sheets, Metal plates, Terminal ballistics, Deformation.

The report briefly describes the theory and procedures used in the Ballistics Branch, Naval Research Laboratory for determining the toughness of materials. It is necessary to separate the total work for crack propagation into two terms: (a) the work per unit crack area used in producing permanent set or that at best slowly recoverable, and (b) the work per unit crack area not associated with permanent set. The permanent set work is often highly dependent on the dimensions of the test piece or structure, as well as on the material and temperature. The non-permanent set work per unit area designated G sub c in this report is relatively insensitive to specimen geometry and dimensions and it is therefore more nearly a materials property. It is not completely so, however. It can be shown that G sub c in a given material depends on the roughness of the fracture and this in turn can be temperature dependent. In general it is less temperature dependent than the permanent set work. By the judicious choice of a probable value of G sub c for a given material it is possible to predict with fair accuracy the strength of a structural member containing a crack of known or assumed dimensions. Calculations of the strength of a damaged piece have been in good agreement with experiments. Gunfire damage experiments were performed not to provide design data or to duplicate battle conditions but rather to reveal some of the important factors which must be kept in mind in planning and interpreting such tests.
AD-655 632 HC$3.00 MF$0.65

COMPUTATIONAL ALGORITHMS IN OPTIMAL CONTROL,
Grumman Aircraft Engineering Corp Bethpage N Y Research Dept
For primary bibliographic entry see Field 12A.
AD-655 735 HC$3.00 MF$0.65

PROPERTIES OF CHAPMAN- JOUGUET DETONATIONS IN STOICHIOMETRIC HYDROGEN-OXYGEN MIXTURES DILUTED WITH HELIUM AND HYDROGEN INTERIM TECHNICAL REPORT.
Toronto Univ. (Ontario).
For primary bibliographic entry see Field 21B.
For abstract, see STAR 05 17.
N67-30304 HC$3.00 MF$0.65

19E. Fire Control and Bombing Systems

PLAN FOR FIRE CONTROL RESEARCH AND DEVELOPMENT.
Army Medical Research Lab Fort Knox Ky
15 Oct 45, 20p

Descriptors: (*Fire control systems, *Human engineering), Effectiveness, Fire control system components, Grenades, Target discrimination, Binoculars, Sights, Range finding, Design.

The purpose of the research was to examine basic concepts and arrive at a plan for fire control research and development which would anticipate future requirements instead of preparing for needs which may no longer exist.
AD-655 577 HC$3.00 MF$0.65

20. PHYSICS

20A. Acoustics

SOUND TRANSMISSION IN HELIUM AND VARIOUS GASES AT LOW PRESSURES.
Technical documentary rept.,
School of Aerospace Medicine, Brooks AFB, Tex.
Julian P. Cooke. Aug 64, 12p SAM-TDR-64-43

Descriptors: (*Sound transmission, *Helium), Oxygen, Nitrogen, Sound pitch, Acoustic properties, Attenuation, Gases, Environment.

This investigation was concerned with (a) the attenuation of sound in atmospheres of room air, 100% nitrogen, oxygen, or helium, and a 50-50 helium-oxygen mixture at reduced barometric pressures, and (b) a pilot study in evaluating oral communications in a 50-50 helium-oxygen atmosphere at a reduced barometric pressure. Reference tables have been prepared to assist in estimating the degree of sound reduction that will take place in each gas or gas mixture at different reduced barometric pressures. The pilot sound study has shown that tonal modification in the helium-oxygen atmosphere does not result in unintelligible oral communications at 395 mm. hg atmospheric pressure. In comparing the value of helium and nitrogen, it is suggested that, because of several yet unknown effects of helium on living systems, nitrogen may serve as a more suitable inert gas if such a gas is employed in the atmosphere of aerospace vehicles. (Author)
AD-447 980 HC$3.00

ON THE STATISTICAL PROPERTIES OF TRANSIENT NOISE SIGNALS,
Naval Ordnance Lab White Oak Md
Edward C. Whitman. 8 Mar 67, 74p Rept no. NOLTR-67-25

Descriptors: (*Statistical functions, *Sound), Underwater sound, Wave transmission, Broadband, Energy, Integral transforms, Band spectrum, Acoustics, Sonar.

A class of random transient signals has been defined as the product of a deterministic envelope waveform of finite integral square and a continuous random process with a well-defined power spectrum and autocorrelation function. The time average autocorrelation function and energy density spectrum of the resulting waveform have been found to be random variables at every value of their arguments. The means and variances of these random variables are derived as functions of the characteristics of the envelope and original noise process. The average autocorrelation function is found to be the product of the autocorrelation functions of envelope and noise, and the average spectrum is given by the convolution of the energy spectrum of the envelope function and the power spectrum of the noise. Examples of the mean and variance calculations are presented for both rectangular and decaying exponential pulse of both broad and narrow band noise. Finally, the implications of these findings for measurement programs and monopulse signal processing are discussed. (Author)
AD-655 228 HC$3.00 MF$0.65

SONIC BOOM EXPERIMENTS AT EDWARDS AIR FORCE BASE.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 1B.
AD-655 310 HC$3.00 MF$0.65

SOUND PRESSURE DISTRIBUTIONS AND RADIATION IMPEDANCE FOR FLEXIBLE DISKS.
Technical memo.,
Navy Underwater Sound Lab New London Conn
Charles H. Sherman, Eileen L. Barrett, and Donald F. Kass. 17 Feb 61, 12p Rept no. USL-TM-912.1-10-61

Descriptors: (*Vibration, Disks), (*Disks, Acoustic properties), Sound, Surface properties, Pressure, Mathematical analysis.

The report describes a method for calculating the near field pressure and radiation impedance for circular disks with certain types of velocity distributions. This is applied to the case of the supported edge disk.
AD-655 323 HC$3.00 MF$0.65

SOUND PRESSURE DISTRIBUTIONS AND RADIATION IMPEDANCE FOR FLEXIBLE DISKS, PART II.
Technical memo.,

Group 20A—Acoustics

Navy Underwater Sound Lab New London Conn
C. H. Sherman. 17 Jul 62, 4p Rept no. USL-TM-912-59-62-Pt-2

Descriptors: (*Disks, Acoustic properties), (*Vibration, Disks), Sound, Pressure, Surface properties, Mathematical analysis.

In a previous memorandum (AD-655 323) a method for calculating the near field pressure and radiation impedance for circular disks with certain types of velocity distributions was described and applied to the supported edge disk. That work will now be extended to include two other cases of practical interest - the clamped edge disk and the supported center disk. (Author)
AD-655 324 HC$3.00 MF$0.65

LIGHT DIFFRACTION BY ULTRASONIC SURFACE WAVES.
Technical rept.,
Georgetown Univ Washington D C Dept of Physics
Walter G. Mayer, and Guillermo B. Lamers. May 67, 29p Rept no. TR-2
Contract Nonr-5037 (01)

Descriptors: (*Ultrasonic radiation, Diffraction analysis), Lasers, Interactions, Light, Diffraction, Integrals, Velocity.

The light intensity distribution in the orders of a diffraction pattern produced by the interaction of progressive ultrasonic surface waves and a monochromatic light beam is calculated. From the diffracted light intensity one can determine the amplitude of the surface wave, and from the spacing of the diffraction orders one obtains the velocity of the surface wave. (Author)
AD-655 466 HC$3.00 MF$0.65

A CONTINUOUS GRADIENT RAY TRACING TECHNIQUE.
Navy Underwater Sound Lab New London Conn
For primary bibliographic entry see Field 17A.
AD-655 617 HC$3.00 MF$0.65

A PREDICTIVE HORIZONTAL-TEMPERATURE-GRADIENT MODEL OF THE UPPER 750 FEET OF THE OCEAN.
Navy Electronics Lab San Diego Calif
For primary bibliographic entry see Field 8J.
AD-655 620 HC$3.00 MF$0.65

EFFECTS OF MULTIPLE PATHS ON ACOUSTICAL SIGNALS.
Final rept.,
Tufts Univ Medford Mass Dept of Mechanical Engineering
Dwight Wayne Batteau. 15 Jun 67, 83p
Contract Nonr-494 (20)

Descriptors: (*Acoustics, Multipath transmission), (*Delay lines, *Magnetostriction), Magnetic fields, Wire, Stresses, Magnetostrictive elements, Ferromagnetic materials, Mechanical waves, Propagation.

Contents: On the electrical generation and sensing of rotational stress waves in metal wire delay lines; Three dimensional stress-strain-magnetic field relations for an isotropic ferromagnetic material; An analytical and experimental study of magnetostrictive delay lines; Magnetic current twist of magnetostriction material contrasted with Wiedmann's twist.
AD-655 637 HC$3.00 MF$0.65

ULTRASONIC-VELOCITY MEASUREMENTS IN WATER AT PRESSURES TO 10,000 kg/sq cm.
Technical rept.,
Harvard Univ Cambridge Mass Lyman Lab of Physics
Gerald Holton. Jun 67, 31p Rept no. TR-2, Communication-6
Contract Nonr-1866 (57)
See also AD-655 693.

Descriptors: (*Ultrasonic radiation, *Underwater sound), High-pressure research, Velocity, Measurement, Water.

Measurements of the velocity of ultrasonic pulses in water are presented for pressures up to about 10,000 kg/sq cm and for temperatures up to 80C. Coefficients obtained from least-squares polynomial fittings of the data are also given, together with an analysis of the reliability and reproducibility of the experimental results. (Author)
AD-655 659 HC$3.00 MF$0.65

ON THE PROPAGATION OF LONGITUDINAL STRESS WAVES IN FINITE SOLID ELASTIC HORNS,
Texas Univ Austin Electroacoustics Research Lab
Gordon E. Martin. 1 Jun 66, 268p Rept no. 1-66
Contract Nonr-4690 (00)

Descriptors: (*Acoustic horns, Propagation), (*Mechanical waves, Propagation), Sound, Rods, Stresses, Transducers, Theory, Resonant frequency, Boundary value problems, Equations of motion.

Theories of stress wave propagation in solid elastic rods of constant and varying cross sections are reviewed. A duality principle is derived that relates the fluid horn case to the one dimensional solution for the solid horn. A new wave equation is derived for tapered rods that can include the effects of lateral inertia and shear. The special case of the conical rod is solved with the inclusion of lateral inertia. Predicted resonant frequencies of two finite length conical rods compared from 0.01 to 1.0% to experimentally measured values. (Author)
AD-655 683 HC$3.00 MF$0.65

AXISYMMETRIC STRESS-WAVE PROPAGATION ACROSS THE PLANE INTERFACE BETWEEN TWO CYLINDRICALLY-BOUNDED MEDIA.
Technical rept.,
Texas Univ Austin Electroacoustics Research Lab
Gerald Kirby Miller, II. 1 Jul 67, 153p Rept no. 1-67
Contract Nonr-4690 (00)

Descriptors: (*Sound transmission, Interfaces), Underwater sound, Transducers, Propagation, Solids, Liquids, Mechanical waves, Wave transmission, Boundary value problems, Cylindrical bodies.

Presented are the analytical derivations, the development of approximations for obtaining results, and some of the computer results in a steady-state axisymmetric stress wave propagation study focusing on the plane interface between two cylindrically bounded, coaxial, ideal media, one solid and one liquid. For stress waves in a 1-1/2 inch diameter nylon rod propagating into an equal diameter water column, acoustic fields on both sides of the interface are calculated. From these fields, intensity, power and transmission loss as a function of frequency are also calculated. (Author)
AD-655 689 HC$3.00 MF$0.65

CALCULATION OF B/A FOR WATER FROM MEASUREMENTS OF ULTRASONIC VELOCITY VS. TEMPERATURE AND PRESSURE TO 10,000 kg/sq cm.
Technical rept.,
Harvard Univ Cambridge Mass Lyman Lab of Physics
M. Paul Hagelberg, Gerald Holton, and Samuel Kao. 1967, 5p Rept no. TR-1, Communication-5
Contract Nonr-1866 (57)
Prepared in cooperation with Wittenberg Univ., Springfield, Ohio. See also AD-655 659.
Availability: Published in The Journal of the Acoustical Society of America v41 n3 p564-7 Mar 1967.

Descriptors: (*Underwater sound, *Ultrasonic radiation), Measurement, Velocity, Temperature, High-pressure research, Water.

New measurements of the velocity of sound in water over a wide range of temperatures and pressures have been made and are used to calculate the nonlinearity parameter B/A in the temperature range from 0 to 80C and at pressures to about 10,000 kg/sq cm. It is found that, for low temperatures, B/A rises to a broad maximum at about 3000 kg/sq cm and then slowly decreases. At the highest temperatures, B/A decreases very slowly with increasing pressure. At 1 atm pressure, the B/A value for 0C is the lowest calculated at any temperature and pressure, and B/A increases monotonically with temperature in the range covered. However, at 3000 kg/sq cm, the B/A value for 0C is the largest obtained, and B/A decreases with increasing temperature. The values of B/A range from a low value of 4.08 at 1 atm and 0C to 6.80 at 3000 kg/sq cm and 0C. B/A is found to be relatively insensitive to temperature and pressure. The usefulness of B/A measurements as a means of studying the liquid state is discussed. (Author)
AD-655 693 Not available from CFSTI.

SOUND GENERATION BY SHOCK-VORTEX INTERACTION,
Syracuse Univ N Y
Darshan S. Dosanjh, and Thomas M. Weeks. 26 May 66, 10p
Grants DA-ARO (D)-31-124-G210, DA-ARO (D)-31-124-G615
Prepared in cooperation with Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
Availability: Published in AIAA Journal v5 n4 p660-9 Apr 1967.

Descriptors: (*Aerodynamic noise, Shock waves), (*Shock waves, *Vortices), Interactions, Equations of motion, Integrals.

The Lighthill-Curle theory of aerodynamic noise generation by bounded flows was applied to the shock-vortex problem utilizing Stratton's method of integrating the governing nonhomogeneous wave equation in two dimensions. The result expresses the unsteady density amplitude and corresponding pressure amplitude around the circumference of the acoustic wave in terms of integrals involving rapidly changing vortex properties across the reflected shock front. As in Curle's work, surface integrals appear leading to dipole sound sources. However, the active surface is the permeable shock wave itself, and an additional monopole source arises. Volume integrals that appear represent Lighthill quadrupoles. By regarding all sound sources as though located at the vortex center at the time it is coincident with the shock front, the analytically determined density amplitude of the acoustic wave, after it has grown beyond 10 vortex core radii, was found to be in excellent over-all agreement with experiment. (Author)
AD-655 713 Nor available from CFSTI.

THE MOTION OF LIQUID INSIDE A CLOSED VIBRATING VESSEL,
Vermont Univ Burlington
For primary bibliographic entry see Field 20D.
AD-655 749 Not available from CFSTI.

ACOUSTIC ENERGY FLUX FROM SHOCK-TURBULENCE INTERACTION.
Technical note,
Toronto Univ (Ontario) Inst for Aerospace Studies

H. S. Ribner. Jul 67, 26p Rept no. UTIAS-TN-108
AFOSR-67-0221
Grant AF-AFOSR-672-66

Descriptors: (*Aerodynamic noise, Energy), (*Shock waves, Turbulence), Acoustic properties, Interactions, Mathematical analysis, Kinetic energy, Canada.

The analysis of the sound field generated by the passage of isotropic turbulence through a shock of finite strength (Ribner, 1953, 1954) was extended to provide the flux of acoustic energy. The energy flux varies almost linearly with shock density ratio, reaching a maximum at infinite Mach number of 0.062 of the flux of turbulence kinetic energy. Direct comparison with a result obtained by Lighthill (1953) is misleading. His energy relations, reckoned relative to a frame moving with the fluid, must be converted to the shock-fixed frame used in this report. The converted results of his theory (weak shocks) and the results of the author's theory (arbitrary shocks) appear to show a similar asymptotic behavior for vanishing shock strength; they diverge with increasing shock strength. (Author)
AD-655 795 HC$3.00 MF$0.65

20B. Crystallography

ESR STUDY OF MANGANESE-DOPED ALPHA-ZINC SILICATE CRYSTALS,
Cornell Univ Ithaca N Y Baker Lab of Chemistry
For primary bibliographic entry see Field 20L.
AD-655 217 Not available from CFSTI.

INVESTIGATION OF THE VARIABLES CONTROLLING THE FLUX GROWTH OF HIGH QUALITY LASER CRYSTALS.
Final rept. 20 Aug 65-19 Aug 66,
American Science and Engineering Inc Cambridge Mass
C. M. Cobb, and E. B. Wallis. 27 Mar 67, 140p
Rept no. ASE-1572
AFCRL-67-0196
Contract AF 19 (628)-5656

Descriptors: (*Lasers, Materials), (*Crystal growth, Control), Sapphires, Ruby, Spinels, Single crystals, Nucleation, Impurities, Convection (Heat transfer), Doping, Solvents, Lanthanum compounds, Fluorides, Alumina.
Identifiers: Fused salts, Lanthanum fluoride.

A study was made of the solution variables, crystal constants, and system parameters which control the growth of large perfect crystals of refractory oxides from fused salt solvents. A set of formulas were developed for the prediction of growth conditions from these fluxes. Cooling rates, thermal gradients, stirring rates, and container dimensions were considered as system parameters. Solubilities, diffusion constants, viscosities, interfacial surface energies, solution and crystal densities, and solute radii were considered as independent variables. The formulas were applied to the prediction of crystal growing conditions for the production of sapphire and ruby from a lanthanum fluoride-aluminum oxide flux. The study included experimental determinations of the densities and viscosities of the lanthanum fluoride-aluminum oxide flux and experiments upon the solubility of aluminum oxide in this flux. Results from the program indicate that past and present difficulties with the fused salt technique of crystal growth have been caused primarily by hydrodynamic factors which may be overcome by detailed planning of experimental growth conditions. (Author)
AD-655 388 HC$3.00 MF$0.65

THE EFFECT OF ORIENTATION AND IMPURITIES ON THE MECHANICAL PROPERTIES OF MOLYBDENUM SINGLE CRYSTALS,
General Electric Research Lab Schenectady N Y
For primary bibliographic entry see Field 11F.
AD-655 412 Not available from CFSTI.

REBINDER EFFECTS IN MgO.
Technical rept.,
Martin Co Baltimore Md Research Inst for Advanced Studies
Albert R. C. Westwood, David L. Goldheim, and Robert G. Lye. Jun 67, 29p Rept no. TR-9, TR-67-6
Contract Nonr-4162 (00)

Descriptors: (*Magnesium oxides, *Dislocations), Hardness, Complex compounds, Chemisorption, Dipole moments, Creep, Band theory of solids, Crystal lattice defects, Illumination.
Identifiers: Rebinder effects.

A study was made of the effects of adsorbed complex ions and organic molecules of various dipole moments on the room temperature mobility of near-surface dislocation half-loops introduced by a diamond indenter into freshly cleaved MgO surfaces. In general, absorbed complexes of high charge (positive or negative), or molecules of high dipole moment, significantly enhance dislocation mobility, leading to the time dependent reductions in hardness termed 'anomalous indentation-creep'. In certain environments, however, for example in aqueous 0.00001 N $AgNO_3$, dislocation mobility is reduced. It is considered that both the latter effect, termed 'adsorption-locking', and anomalous indentation-creep effects belong to the class of phenomena known as Rebinder effects. Observations of a photomechanical effect in MgO, and of inhibition of enhanced mobility also are described. A possible explanation for Rebinder effects in ionic crystals is suggested. This is that chemisorption-induced band bending in the surface regions of the crystal alters both the electronic core structure (charge) of near-surface dislocations, and the state of ionization of point defects such as vacancies and impurities. As a consequence, the nature of the interactions between moving dislocations and such lattice defects is changed, affecting dislocation mobility and, hence, microhardness. The existence of Rebinder effects in metals is briefly discussed. (Author)
AD-655 455 HC$3.00 MF$0.65

BONDING, STRUCTURE AND MECHANICAL BEHAVIOR OF VANADIUM CARBIDE 9 SINGLE CRYSTALS.
Technical rept.,
Martin Co Baltimore Md Research Inst for Advanced Studies
R. G. Lye, G. E. Hollox, and J. D. Venables. Jun 67, 22p Rept no. TR-67-5
AROD-6388:1-MC
Contracts NASw-1290, DA-31-124-ARO (D)-467

Descriptors: (*Single crystals, *Carbides), (*Vanadium compounds, Carbides), Band theory of solids, Compressive properties, Anisotropy, Chemical bonds, Titanium compounds.
Identifiers: Vanadium carbide.

An approximate band structure for VC has been derived. From this, it is concluded that the bonding in VC arises primarily from interactions between orbitals on the metal atoms, and that this component of the bonding is stronger in VC than in TiC. Measurements of the compressive yield strength of VC0.85 single crystals over the range 900 - 1800C support this conclusion. However, a domain structure, associated with ordered carbon vacancies, has been observed in these crystals. The anisotropy introduced by such ordering may also contribute to the higher strength of this material. (Author)
AD-655 456 HC$3.00 MF$0.65

FERROELECTRICITY,
California Univ San Diego La Jolla
For primary bibliographic entry see Field 20C.
AD-655 483 Not available from CFSTI.

GRAIN BOUNDARIES IN CUBIC IONIC SOLIDS.
Final rept. 1 Jul 60-30 Jun 67,
Iowa State Univ of Science and Technology Ames
Thomas D. McGee. 17 Jul 67, 9p
AROD-2916:5-MC
Contract DA-31-124-ARO (D)-418

Descriptors: (*Ductility, Solids), (*Grain boundaries, Ductility), Single crystals, Sodium chloride, Crystal lattice defects, Mechanical properties, Internal friction, Dislocations, Yield point.
Identifiers: Ionic crystals, Cubic crystals.

This is a final report for research conducted on the ductility of cubic ionic solids in the transition from single crystal to the polycrystalline state. As such the project included research on single crystals, bicrystals, tricrystals, and polycrystalline specimens. Almost all of the work was conducted on NaCl as a structural model for MgO. Limited research was conducted on CaO, MgO, and LiF. (Author)
AD-655 525 HC$3.00 MF$0.65

MASS INDEPENDENCE OF U-CENTER-INDUCED PHONON RESONANCES IN KI,
Northwestern Univ Evanston Ill Dept of Physics
For primary bibliographic entry see Field 20L.
AD-655 545 Not available from CFSTI.

ORIENTATION RELATIONS IN SIMPLE THIN FILM-SUBSTRATE COMBINATIONS.
Technical rept.,
Georgia Inst of Tech Atlanta Engineering Experiment Station
R. J. Gerdes, and R. A. Young. 15 Jul 67, 48p
Rept no. TR-6
Contract Nonr-991 (09)

Descriptors: (*Crystal growth, Alignment), (*Films, Crystal growth), Substrates, Epitaxial growth, Reviews, Nucleation.

For oriented overgrowth in simple systems, the importance of a nucleation mechanism based on alignment of close-packed (CP) directions is assessed by a comprehensive review of the literature. Depending on temperature and crystalline character of the substrate, the mechanism results in either (1) alignment of CP-directions in the deposit with corresponding directions in the substrate or (2) maximization of the number of CP-directions in the deposit plane parallel to the interface. For FCC and HCP metals on NaCl-type and amorphous substrates, approximately 3,000 papers yielded some 600 usable reports representing 42 distinct orientation relationships. Eighty-six percent of the reports represented twenty orientation relationships accounted for by the 'CP-mechanism'. Eight percent of the reports referred to four related orientations not accounted for by this mechanism. The remaining eighteen orientations were, for the most part, supported only by single observations. Thus the weak but long-range forces involved in the CP-mechanism appear to be of primary, though not sole, importance in the nucleation of oriented overgrowths in these simple systems. The observation information is presented in extensive tables. (Author)
AD-655 652 HC$3.00 MF$0.65

CRYSTAL SYMMETRY, OPTICAL PROPERTIES, AND FERROELECTRIC POLARIZATION OF $Bi_4Ti_3O_{12}$ SINGLE CRYSTALS,
Air Force Avionics Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20L.
AD-655 688 Not available from CFSTI.

HIGH-MAGNETIC-FIELD STUDIES OF ORTHORHOMBIC AND RHOMBOHEDRAL Al2-xFexO3 COMPOUNDS,
Massachusetts Inst of Tech Cambridge National Magnet Lab
For primary bibliographic entry see Field 20L.
AD-655 721 Not available from CFSTI.

MAGNETIC MOMENT MEASUREMENTS IN SINGLE-CRYSTAL Dy, Ho, Er, AND Gd IN dc FIELDS UP TO 170 kG,
Massachusetts Inst of Tech Cambridge National Magnet Lab
S. Foner, and E. J. McNiff, Jr. 1967, 2p
AFOSR-67-1674
Contract F44620-67-C-0047
Availability: Published in Journal of Applied Physics v38 n3 p1377 Mar 1 1967.

Descriptors: (*Single crystals, Magnetic moments), (*Rare earth elements, Magnetic moments), Dysprosium, Erbium, Gadolinium, Holmium, Cryogenics.

Magnetic-moment measurements are presented for single-crystal Dy, Ho, Er and Gd with applied fields up to 170 kG. These results, obtained for various crystallographic orientations with a low frequency VSM developed for use in the NML dc solenoids, extend and augment a number of earlier measurements, including the recent pulsed field data of Flippen. The magnetic data are complex as is expected from the known magnetic structures at low fields. Briefly, at 4.2K and with B sub 0 parallel to C we find: (a) Dy-M increases slowly up to 170 kG; (b) Ho-M increases rapidly up to 12 kG, then more slowly, and there is a further rapid increase (transition) at about 130 kG; (c) Er-M increases rapidly up to 30 kG then approaches saturation more slowly; (d) Gd-M increases rapidly up to 25 kG and then is almost constant. For B sub 0 perpendicular to C we find: (a) Dy-M increases rapidly at low fields and approaches saturation at high fields; (b) Ho-M increases rapidly at low fields and approaches saturation at high fields; (c) Er--broad transitions occur at about 16 and 120 kG; (d) Gd--the results are similar to those for B sub 0 parallel to C. Except for Gd, the magnetic moments generally show an appreciable increase up to our maximum fields. Magnetic-moment measurements have also been completed for these materials at 77K. (Author)
AD-655 722 Not available from CFSTI.

ON THE AlB2 TYPE PHASES,
Texas Univ Austin Dept of Chemical Engineering
Aravamudhan Raman. 23 Aug 66, 7p
AFOSR-67-1669
Grant AF-AFOSR-806-65, Contract NSF-GP-2029
Availability: Published in Zeitschrift fuer Metallkunde v58 n3 p179-84 1967.

Descriptors: (*Intermetallic compounds, Phase studies), Alloys, Crystal structure, Crystal lattices, Atomic orbitals, Chemical bonds, Aluminum compounds, Borides.

The occurrence of the AlB2-type structure in the metallic alloys was examined for a general rule. The structure occurs in three different branches of which the one found in the compounds of the transition elements with the non transition elements represents a major group. The lattice parameters, the axial ratios and the interatomic distances in the various compounds indicate that the valence electron concentration has strong influence on these parameters. The bonding characteristics in the various compounds and the crystal chemistry of the AlB2-type structure within the family of structures of AB2 stoichiometry are discussed. The AlB2-structure links the major Laves-Phases structures with the disilicide family of structures. (Author)
AD-655 743 Not available from CFSTI.

INFLUENCE OF ELECTRIC FIELDS ON THE MOLECULAR ALIGNMENT IN THE LIQUID-CRYSTAL PARA-AZOXYANISOLE,
Maine Univ Orono Dept of Physics
For primary bibliographic entry see Field 7D.
AD-655 754 Not available from CFSTI.

MATERIALS RESEARCH AT STANFORD UNIVERSITY.
Stanford Univ., Calif. Center for Materials Research.
For primary bibliographic entry see Field 11G.
PB-174 980 HC$3.00 MF$0.65

DEFORMATION TWINNING IN Ni AND F.C.C.Fe-Ni ALLOYS,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
For primary bibliographic entry see Field 11F.
PB-175 619 HC$3.00 MF$0.65

20C. Electricity and Magnetism

SECONDARY ELECTRON EMISSION FROM SATELLITE SURFACES,
General Dynamics/Convair, San Diego, Calif.
For primary bibliographic entry see Field 22B.
AD-274 799 HC$3.00

COMMENT ON THE PAPER 'PHOTOELECTRIC ION EMISSION FROM CESIATED SURFACES',
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
M. L. Shaw, and R. E. Stickney. 20 Mar 67, 3p
Contract DA-28-043-AMC-02536 (E)
Availability: Published in Physical Review Letters v18 n20 p824-6 May 15 1967.

Descriptors: (*Photoelectric effect, *Cesium), Ions, Photoelectrons, Electrodes, Anomalies, Experimental design, Surface properties.

A recent paper (O.P. Breaux and G. Medicus, Phys. Rev. Letters 16, 392 (1966)) reported experimental data which indicated that ions as well as electrons may be emitted photoelectrically from cesium-coated electrodes. The present paper describes experiments providing evidence that the anomalous currents that they assumed to be caused by ions are actually caused by electrons.
AD-655 202 Not available from CFSTI.

OSCILLATORS UTILIZING SUPERCONDUCTING RESONATORS,
Texas Univ Austin Dept of Electrical Engineering
For primary bibliographic entry see Field 9A.
AD-655 215 Not available from CFSTI.

FORM FACTORS AT LARGE MOMENTUM TRANSFER,
State Univ of New York Stony Brook
For primary bibliographic entry see Field 20H.
AD-655 221 Not available from CFSTI.

THEORY OF ELECTROMAGNETIC PROPERTIES OF STRONG-COUPLING AND IMPURE SUPERCONDUCTORS. II.
Doctoral thesis,
Illinois Univ Urbana Dept of Physics
Sang Boo Nam. 4 Nov 66, 9p
AROD-431:85
Contract DA-31-124-ARO (D)-114
Availability: Published in The Physical Review v156 n2 p487-93 Apr 10 1967.

Descriptors: (*Superconductivity, Electromagnetic properties), (*Lead, Superconductivity), Magnetic materials, Impurities, Band theory of solids, Electrical conductance, Mathematical analysis.

The effects of strong coupling and of spin-flip scattering by magnetic impurities on the electromagnetic properties of superconductors are discussed. We have found that the surface resistance (Rs/Rn) of lead, a strong-coupling superconductor, reflects the phonon spectrum and has characteristic peaks (approximately equal to 1.02) near frequencies approximately equal to 0.008 and 0.011 eV, and has a small dip (approximately equal to 0.95) near frequency approximately equal to 0.022 eV. Extensive calculations of the conductivity and surface impedance for superconductors containing magnetic impurities at finite temperatures, especially in the gapless region, are described. (Author)
AD-655 305 Not available from CFSTI.

A REFORMULATED BOUNDARY PERTURBATION THEORY IN ELECTROMAGNETISM AND ITS APPLICATION TO A SPHERE,
Massachusetts Inst of Tech Lexington Lincoln Lab
M. L. Burrows. 9 Jan 67, 16p Rept no. JA-2870B
ESD-TR-67-313
Contract AF 19 (628)-5167
Availability: Published in Canadian Journal of Physics v45 p1729-43 1967.

Descriptors: (*Electromagnetic fields, Boundary value problems), Electromagnetism, Spheres, Perturbation theory, Taylor's series, Integral equations.

The classical method of solving electromagnetic field problems involving boundary perturbations is reformulated in a way that is both more general and simpler. The new formulation makes it easier to apply the theory to the class of boundaries amenable to the classical formulation, and shows that it can also be applied to other boundary shapes. As an example, the perfectly conducting sphere with surface perturbations has been treated, using the methods appropriate only for boundaries in the classical class and also using those applicable to the larger class. Some experimental results which appear to support the theory are reported. (Author)
AD-655 316 Not available from CFSTI.

PARALLEL OBLIQUE-INCIDENCE ANISOTROPY IN NiFe FILMS.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20L.
AD-655 325 Not available from CFSTI.

ON THE POSSIBLE PHASE TRANSITION FOR TWO-DIMENSIONAL HEISENBERG MODELS.
Meeting speech,
Massachusetts Inst of Tech Lexington Lincoln Lab
Harry E. Stanley, and Thomas A. Kaplan. 1967, 4p Rept no. MS-1747
ESD-TR-67-270
Contract AF 19 (628)-5167
Prepared in cooperation with Harvard Univ., Cambridge, Mass. Lyman Lab. of Physics.
Availability: Published in Journal of Applied Physics v38 n3 p975-6 Mar 1 1967.

Descriptors: (*Ferromagnetic materials, Phase studies), (*Nuclear spins, Ferromagnetism), Magnetic fields, Transformations, Interactions, Theory.
Identifiers: Heisenberg ferromagnet.

Evidence was previously presented (Phys. Rev. Letters v17 p913 1966) suggesting the presence of a phase transition for two-dimensional Heisenberg models with nearest-neighbor ferromagnetic interactions and S > 1/2. An analysis is now given

of the first six coefficients of the high-temperature series for the zero-field susceptibility, and incorporate the results of recent calculations beyond sixth order into the arguments for a phase transition. It is found that the higher-order coefficients support the previous suggestion concerning the existence of a phase transition for S > 1/2, and are consistent with a zero critical temperature for the particular case S = 1/2. Finally, two preliminary calculations on the nature of the low-temperature phase are described. The first of these, due to Dyson, is an intuitive generalization of spin wave theory. The other is an approximate calculation for the rectangular net within the classical Heisenberg model: Considering this net to consist of linear chains, the intrachain interactions are treated exactly, while the interchain interactions are treated via a molecular field approximation. Both of these calculations support the original suggestion of a phase transition for two-dimensional Heisenberg models. (Author)
AD-655 326 Not available from CFSTI.

DEPENDENCE OF CRITICAL PROPERTIES OF HEISENBERG MAGNETS UPON SPIN AND LATTICE.
Meeting speech,
Massachusetts Inst of Tech Lexington Lincoln Lab
Harry E. Stanley, and Thomas A. Kaplan. 1964, 4p Rept no. MS-1746
ESD-TR-67-269
Contract AF 19 (628)-5167
Prepared in cooperation with Harvard Univ., Cambridge, Mass. Lyman Lab. of Physics.
Availability: Published in Journal of Applied Physics v38 n3 p977-9 Mar 1 1967.

Descriptors: (* Ferromagnetic materials, Transformations), (* Nuclear spins, Ferromagnetism), (* Crystal lattices, Ferromagnetism), (* Spinels, Magnetic properties), Transition temperature, Magnetic fields, Interactions, Theory.
Identifiers: Heisenberg ferromagnet.

High-temperature expansion methods have recently been used to predict the form of the divergence of the zero-field static susceptibility chi at the critical temperature Tc. These studies have suggested that chi approx. = A (T-Tc) exp. -gamma, with gamma = 4/3 independent of both lattice structure and spin quantum number S. It is argued that the proposal gamma = 4/3 for all S is unjustified; a slow but nevertheless clear variation of gamma with S is found. It is further pointed out that there exists at least one physically interesting lattice--a normal cubic spinel with nearest-neighbor ferromagnetic B-B interactions--for which the theoretical evidence indicates that if the power-law form of divergence is correct, gamma may differ from 4/3 by as much as 50%. (Author)
AD-655 327 Not available from CFSTI.

BISTATIC SCATTERING CROSS SECTION OF A RANDOMLY-ORIENTED DIPOLE,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 17I.
AD-655 329 Not available from CFSTI.

DIAMAGNETIC AND PARAMAGNETIC SURFACE CURRENTS INDUCED BY TEMPERATURE CHANGES IN TYPE II SUPERCONDUCTORS IN STATIC MAGNETIC FIELDS,
Aerospace Corp El Segundo Calif Labs Div
M. A. R. LeBlanc, D. J. Griffiths, and B. C. Belanger. May 67, 19p Rept no. TR-10001 (9230-01)-3
SSD-TR-67-104
Contract AF 04 (695)-1001
Prepared in cooperation with University of Southern California, Los Angeles. Electronics Sciences Lab.

Descriptors: (* Superconductors, Electrical properties), Magnetic fields, Temperature, Paramagnetic materials, Magnetic properties, Surface properties, Electric currents.

We present evidence that a change in surface currents from critical paramagnetic to critical diamagnetic (or from critical diamagnetic to critical paramagnetic) is induced by a suitable increase (or decrease) of the temperature of a semireversible type II superconductor immersed in a static magnetic field H < H subscript c2. (Author)
AD-655 377 HC$3.00 MF$0.65

MICROWAVE MEASUREMENTS OF THE SURFACE IMPEDANCE OF SUPERCONDUCTING TIN AND LEAD.
Technical rept.,
Stanford Univ Calif High Energy Physics Lab
John P. Turneaure. May 67, 84p Rept no. HEPL-507
Contract Nonr-225 (67)

Descriptors: (* Surface properties, Superconductors), (* Electrical impedance, Superconductors), Theses, Microwaves, Temperature, Measurement, Tin, Lead, Band theory of solids, Cryogenics.

In this dissertation, the results of two different experiments are reported. In the first experiment, temperature dependent measurements were made of the surface impedance of superconducting tin and lead at 2.85 and 11.2 GHz; these surface impedance measurements were compared with the Mattis and Bardeen theoretical result, including a finite electron-pair coherence length and a finite electron mean free path. In the second experiment, temperature dependent measurements were made of the ac critical magnetic field of superconducting tin at 2.85 GHz; these ac critical magnetic field measurements were compared with dc critical magnetic field measurements. These two experiments stemmed from the program at Stanford University to develop a superconducting linear accelerator. (Author)
AD-655 452 HC$3.00 MF$0.65

FERROELECTRICITY,
California Univ San Diego La Jolla
B. T. Matthias. 1967, 5p
AFOSR-67-1610
Grant AF-AFOSR-631-64
Prepared in cooperation with Bell Telephone Labs., Murray Hill, N. J.
Availability: Published in Journal of Applied Physics v38 n3 p928-30 Mar 1 1967.

Descriptors: (* Ferroelectricity, Reviews), Chemical bonds, Ferroelectric crystals, Dielectric properties, Anomalies, Polarization, Tungsten compounds.

Ferroelectricity is a very general phenomenon. Yet it is possible to divide it into three main groups with essentially three different mechanisms: the order-disorder of hydrogen bonds, the trigger effect of nonspherical radicals, and the 4 pi/3 catastrophe due to high electronic polarizabilities. Recently it has been realized that some of the metallic bronzes crystallizing in the perovskite structure may also be ferroelectric. At present, it is very difficult to determine ferroelectricity in these metals. (Author)
AD-655 483 Not available from CFSTI.

SUPERCONDUCTIVITY AT 20 DEGREES KELVIN,
California Univ San Diego La Jolla
B. T. Matthias. 22 Apr 67, 4p
AFOSR-67-1616
Grant AF-AFOSR-631-67
Prepared in cooperation with Bell Telephone Labs., Murray Hill, N. J.
Availability: Published in Science v156 n3775 p645-6 May 5 1967.

Descriptors: (* Superconductivity, Cryogenics), (* Intermetallic compounds, * Superconductors), Niobium alloys, Aluminum alloys, Germanium alloys, Solid solutions, Crystal structure, Valence, Transition temperature.

A superconductor was found with a transition temperature at 20K. The substance is a solid solution between Nb3Al and Nb3Ge. The increase of superconducting transition temperature to 20K was accomplished through the formation of a solid solution between Nb3Al and Nb3Ge, crystallizing in the beta-W structure. There is no real explanation for the high transition temperatures apart from the hypothesis that the stoichiometry of Nb3Al or perhaps even of the intermediate composition was improved considerably over that of the normal Nb3Al or Nb3Ge. It was concluded that the variation of the average number of valence electrons per atom is decisive. (Author)
AD-655 490 Not available from CFSTI.

EFFECTS OF MULTIPLE PATHS ON ACOUSTICAL SIGNALS.
Tufts Univ Medford Mass Dept of Mechanical Engineering
For primary bibliographic entry see Field 20A.
AD-655 637 HC$3.00 MF$0.65

INTERPRETATION OF LOW-VOLTAGE PHOTOMEASUREMENTS IN METAL-INSULATOR-METAL FILMS.
Revised ed.,
Air Force Avionics Lab Wright-Patterson AFB Ohio
Fritz L. Schuermeyer, and Julian A. Crawford.
9 Sep 66, 5p Rept no. AFAL-TR-66-364
Revision of manuscript submitted 1 Aug 66.
Availability: Published in Applied Physics Letters v9 n8 p317-9 Oct 15 1966.

Descriptors: (* Films, * Photoelectric effect), Metal films, Dielectric films, Sandwich construction, Electric insulation, Photodiodes, Diodes, Voltage.

A simple method of separating the opposing photocurrent components which occur in thin-film, metal-insulator-metal sandwich structures at low (or zero) applied bias voltages is presented. The method uses data obtained by illuminating the sample first from one side and then from the other, both electrodes being semitransparent, and calculating the ratio of the resulting photo-yields over a suitable photon energy range. The analysis has been applied to evaporated Al-Al3O3-Al diodes in which the Al2O3 layer was formed by evaporation of sapphire. The experimental results show that the proposed analysis is adequate for its intended purpose. (Author)
AD-655 686 Not available from CFSTI.

CRYSTAL SYMMETRY, OPTICAL PROPERTIES, AND FERROELECTRIC POLARIZATION OF Bi4Ti3O12 SINGLE CRYSTALS,
Air Force Avionics Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20L.
AD-655 688 Not available from CFSTI.

HIGH-MAGNETIC-FIELD STUDIES OF ORTHORHOMBIC AND RHOMBOHEDRAL Al2-xFexO3 COMPOUNDS,
Massachusetts Inst of Tech Cambridge National Magnet Lab
For primary bibliographic entry see Field 20L.
AD-655 721 Not available from CFSTI.

MAGNETIC MOMENT MEASUREMENTS IN SINGLE-CRYSTAL Dy, Ho, Er, AND Gd IN dc FIELDS UP TO 170 kG,
Massachusetts Inst of Tech Cambridge National Magnet Lab

For primary bibliographic entry see Field 20B.
AD-655 722 Not available from CFSTI.

FERROMAGNETISM IN Au4V,
California Univ San Diego La Jolla
L. Creveling, H. L. Luo, and G. S. Knapp. 29 Mar 67, 4p
AFOSR-67-1675
Grant AF-AFOSR-631-67
Availability: Published in Physical Review Letters v18 n20 p851-2 May 15 1967.

Descriptors: (* Ferromagnetic materials, * Intermetallic compounds), (* Gold alloys, Ferromagnetism), (* Vanadium alloys, Ferromagnetism), Crystal structure, Magnetic properties, Anisotropy, Transition temperature.

In a search for an explanation of the anomalies observed in low-temperature magnetic-susceptibility data, on Au-V alloys, it was found that the compound Au4V becomes ferromagnetic at 43K. This is only the third ferromagnetic intermetallic compound known to date which is composed of nonmagnetic metals (after Sc3In and ZrZn2). In addition, it is the only known ferromagnet composed of vanadium and other nonmagnetic elements. (Author)
AD-655 727 Not available from CFSTI.

MAGNETIC PROPERTIES OF FexO AS RELATED TO THE DEFECT STRUCTURE,
Northwestern Univ Evanston Ill
For primary bibliographic entry see Field 20L.
AD-655 757 Not available from CFSTI.

TRANSMISSION LINE MODELS OF MAGNON-PHONON MODES IN FERRITES. PART II. COUPLED MODES.
Physical sciences research papers no. 327,
Air Force Cambridge Research Labs L G Hanscom Field Mass
James C. Sethares. May 67, 29p Rept no. AFCRL-67-0314

Descriptors: (* Ferromagnetic materials, Quantum mechanics), Ferrites, Transmission lines, Models (Simulations), Phonons, Nuclear spins, Polarization, Circuits, Resonance.
Identifiers: Coupling (Electromagnetic), Magnons, Magnetoacoustics.

In AD-641 638 uncoupled transmission line models for circularly-polarized shear waves and magnons in ferrites are described. Voltage and current variables are defined in terms of magnetic and mechanical variables and line elements are related to magnon-phonon parameters. Three models of coupled modes are now developed. The models are analytically equivalent but they differ in their physical interpretation. One model uses controlled sources as the coupling elements, and another uses a distributed transformer. Coupling in the final model is accounted for by line element modifications in the presence of mutual coupling. Boundary conditions for the distributed transformer coupling model are given. They include capacitive terminations on the magnetic line, a lumped transformer between magnetic and acoustic lines, and the loading of the combined system with a third acoustic line. These boundary conditions account for arbitrary acoustic loading of the magneto-acoustic media by a phonon supporting substrate and a range of boundary conditions between pinned and unpinned spin for the magnetic system. Distributed and nondistributed externally controlled sources may be placed anywhere in the coupled system. A Poyntings-type theorem for each model and expressions for group velocity, magneto-elastic resonant frequencies, and Q's are derived. A brief summary and conclusion which discusses various aspects of the coupled transmission line models is given. (Author)
AD-655 777 HC$3.00 MF$0.65

20D. Fluid Mechanics

DEVELOPMENT OF DESIGN CRITERIA FOR ROOF WASHDOWN SYSTEMS: A STUDY OF THE RELATIONSHIP OF SLOPE TO PARTICLE TRANSPORT BY WATER FILMS,
Naval Radiological Defense Lab., San Francisco, Calif.
Raymond H. Heiskell, Robert J. Crew, and Noah J. Vella. 4 Jun 64, 46p USNRDL-TR-834
Contract CDM-SR-59-54

Descriptors: (* Particles, Transport properties), (* Radioactive fallout, Water waves), Water, Decontamination, Roofs, Laminar flow, Spheres, Design, Anemometers, Tables, Velocity, Test methods, Test facilities.

This is the sixth report on a series of tests designed to study the basic principles involved in transport of particulate matter by water films. The previous reports covered the transport of particulate matter by various water flow rates on an ideal surface at one of five slopes from 0 to 0.165. This report covers the relationship of slope to transport on an ideal surface. On a near-horizontal surface, no transport occurs when the water flow rate is insufficient to produce turbulent flow. The slightest slope causes particles to be transported at low water flow rates in laminar flow. Surface waves, which are present at all slopes under most flow conditions, increase transport rate. An empirical equation is presented for the computation of the transport velocities of both spherical and irregular shaped particles. The maximum amount of particulate matter that can be transported is presented. (Author)
AD-464 189 HC$3.00

A THEORY FOR THE SLIP-FLOW BOUNDARY CONDITIONS OVER A SURFACE DEFINED BY ARBITRARY GAS-SURFACE INTERACTION PARAMETERS,
Cornell Univ Ithaca N Y
S. F. Shen. 1967, 18p
Contract AF 49 (638)-1346
Availability: Published in Rarefied Gas Dynamics Symposium (5th) v1 p623-40 1967.

Descriptors: (* Superaerodynamics, Boundary layer), Surfaces, Velocity, Interactions, Knudsen number, Integral equations, Temperature, Diffusion, Theory.
Identifiers: Slip flow.

The velocity slip and the temperature jump at a body surface to be used with the Navier-Stokes equations depend on the asymptotic behavior of the Knudsen layer at large distances from the wall. In the continuum limit the Knudsen layer reduces to a locally defined half-space problem. By linearizing the Krook model, the resulting simultaneous integral equations are essentially those given by Welander (1954), but are in general coupled if arbitrary gas-surface interaction is allowed. A variational principle is derived for the efficient handling of such a system. Its effectiveness is demonstrated by the excellent values obtained for the velocity slip and temperature jump at a diffusely reflecting wall with full accommodation. (Author)
AD-655 195 Not available from CFSTI.

LAGALLY'S THEOREM FOR MULTIPOLES,
Iowa Univ Iowa City Inst of Hydraulic Research
L. Landweber. 1967, 3p Rept no. Reprint-225
Contract Nonr-1611 (07)
Availability: Published in Schiffstechnik v14 n70 p19-21 1967.

Descriptors: (* Hydrodynamics, Theorems), Force (Mechanics), Moments, Potential theory, Momentum, Equations.
Identifiers: Lagally's theorem.

The work was undertaken in connection with a study of the forces and moments on spheroids in arbitrary potential flows, in the course of which it appeared that alternative, compact expressions for the force and moment would be desirable. A relatively simple proof of the Lagally theorem is presented.
AD-655 199 Not available from CFSTI.

GENERATION OF VORTICITY BY WAVES IN A PLASMA,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20I.
AD-655 208 Not available from CFSTI.

SIMPLE CLASSICAL MODEL FOR THE SCATTERING OF GAS ATOMS FROM A SOLID SURFACE: ADDITIONAL ANALYSES AND COMPARISONS,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
R. M. Logan, J. C. Keck, and R. E. Stickney. 1967, 18p
Contract DA-36-039-AMC-03200 (E)
Availability: Published in Rarefied Gas Dynamics Symposium (5th) v1 p49-66 1967.

Descriptors: (* Gases, Scattering), Surfaces, Superaerodynamics, Atoms, Probability, Surface roughness, Quantum mechanics.

The simple classical model for the scattering of gas atoms from a solid surface as described recently by Logan and Stickney (J. Chem. Phys. 44, 195 (1966)) is further developed and the basic assumptions are examined in detail. The analysis is modified so that a closed-form expression is obtained for the angular distribution of the scattered atoms. With this expression it is possible to identify the principal parameters of the model. The theoretical results are in qualitative agreement with recent experimental data for the scattering of a molecular beam from a solid surface. A closed-form expression is also obtained for the dependence of the velocity distribution of the scattered atoms on the angle of scattering. The analysis is extended to include, in an approximate manner, the effects of surface roughness and a square-well gas-surface potential. (Author)
AD-655 211 Not available from CFSTI.

THE SPIN UP OF A STRATIFIED FLUID,
Massachusetts Inst of Tech Cambridge Dept of Mathematics
Joseph Pedlosky. 19 May 66, 19p
AFOSR-67-1575
Grant AF-AFOSR-492-66
Availability: Published in J. Fluid Mech. v28 pt3 p463-79 1967.

Descriptors: (* Fluids, Spin), Density, Diffusion, Boundary layer, Cylindrical bodies, Mathematical analysis.
Identifiers: Stratified media.

The process by which a stratified, viscous fluid adjusts to small changes in the rotation rate of its container is studied. The paper treats the cases of homogeneous layers of different densities as well as fluids which are continuously stratified. It is shown that in several important cases the spin-up process, especially in the continuously stratified case, has a time scale which is very much longer than for homogeneous fluids, and that diffusion is the governing mechanism in the adjustment process. In all cases the detailed problem, including a discussion of the side-wall boundary layers, is presented. Some novel features of the side-wall layers are discussed for the continuously stratified fluids, while in one case it is shown that no boundary layers appear during the transient approach to equilibrium. (Author)
AD-655 218 Not available from CFSTI.

THE PRECESSION AND NUTATION OF DEFORMABLE BODIES III. OSCILLATIONS OF INCOMPRESSIBLE VISCOUS GLOBES,
Boeing Scientific Research Labs Seattle Wash
Zdenek Kopal. May 67, 20p Rept no. D1-82-0618, Mathematical note-513

Descriptors: (*Fluids, Oscillation), Incompressible flow, Viscosity, Rheology, Moon, Gravity, Functions, Frequency, Precession.

The purpose of the report is to specify the form of the characteristic functions, and the nature of the spectrum of characteristic frequencies, of free nonradial oscillations of selfgravitating incompressible fluid globes of constant density and viscosity, in terms of which their forced oscillations (such as lunar librations invoked by the gravitational attraction of the Earth and the Sun) are later to be expanded. Kelvin's problem is generalized to configurations of arbitrary viscosity, and solved analytically in a closed form in terms of complex functions. (Author)
AD-655 223 HC$3.00 MF$0.65

A FORTRAN PROGRAM FOR THE CALCULATION OF COMPRESSIBLE LAMINAR BOUNDARY LAYERS,
New York Univ N Y Dept of Aeronautics and Astronautics
Patricia Anton. Dec 66, 56p Rept no. NYU-AA-66-71
Contract Nonr-285 (63)

Descriptors: (*Laminar boundary layer, Numerical analysis), Computer programs, Compressible flow, Equations, Iterative methods.

A FORTRAN computer program for the numerical solution of the compressible laminar boundary layer equations is presented. The method of solution employed is an implicite finite difference integration scheme, by which the velocity components and the temperature are determined in the physical plane. All possible boundary conditions and arbitrary initial conditions can be treated. The pertinent aspects of the solution are discussed in detail. Operating instructions are presented along with a flow chart and the listing of the program and sample calculations are included for check-out purposes. (Author)
AD-655 237 HC$3.00 MF$0.65

THE TORQUE ON A FINITE DISK EXECUTING DAMPED HARMONIC OSCILLATIONS IN A VISCOUS FLUID NEAR A RIGID BOUNDARY,
Naval Ship Research and Development Center Washington D C Acoustics and Vibration Lab
Fred C. de Metz. Jun 67, 54p
NSRDC-2395

Descriptors: (*Fluid flow, Torque), (*Disks, Oscillation), Damping, Boundary layer, Viscosity, Cylindrical bodies, Mathematical analysis.

Expressions are derived for the torque exerted on a finite cylindrical disk which executes torsional oscillations about the cylindrical axis while immersed in a viscous fluid parallel to a rigid plane boundary. Relations for the total torque of the fluid are given in terms of the period and decrement of disk oscillation for small, large, and intermediate separation distances between the disk and the rigid plane boundary. Mathematical relations and graphic results are presented in a form intended to aid investigators in studying the properties of fluids flowing in narrow channels. (Author)
AD-655 238 HC$3.00 MF$0.65

POWERED MODEL INVESTIGATION OF THE EFFECTS OF GATED SPOILERS ON THE AERODYNAMIC CHARACTERISTICS OF WINGS AT ANGLES OF ATTACK FROM 0 TO 90 DEGREES,
Naval Ship Research and Development Center Washington D C Aerodynamics Lab
Kenneth R. Reader, and Richard D. Murphy. Apr 67, 59p Rept no. Aero-1132
NSRDC-2406

Descriptors: (*Spoilers, Model tests), (*Wings, Aerodynamic characteristics), Angle of attack, Leading edge, Short take-off planes, Tilt wings, Stalling, Optimization.

An investigation was conducted to evaluate the effects of a gated spoiler near the upper surface leading edge of a propeller powered wing model. The device was considered appropriate for solution of a particular handling qualities problem in tilt-wing V/STOL aircraft that is related to wing stall phenomena. The data gathered indicate that a descending-decelerating approach of perhaps 20 degrees may be possible with the spoiler system. The most significant aspect of the benefits of the subject spoiler lies in the probable high insensitivity to wing planform (aspect ratio) which will allow freedom in the optimization of wing design. (Author)
AD-655 248 HC$3.00 MF$0.65

ROTOR AIR LOADS, BLADE MOTION, AND STRESS CAUSED BY TRANSIENT INPUTS OF SHAFT TORQUE AS RELATED TO STOPPABLE ROTOR OPERATION,
Cornell Aeronautical Lab Inc Buffalo N Y
L. Segel. May 67, 146p Rept no. CAL-BB-1840-S-2
USAAVLABS-TR-67-18
Contract DA-44-177-AMC-77 (T)

Descriptors: (*Rotary wings, *Aerodynamic loading), Loading (Mechanics), Torque, Elasticity, Shafts, Bending, Power, Reduction, Wake, Stresses, Motion, Operation.

The transient-response calculation method is extended to yield aerodynamic loadings and elastic-blade motions in response to changes of shaft torque input. Loadings, bending moments, and modal responses are obtained for a teetering rotor experiencing both a 100- and a 50-percent power loss. Similarly, responses are computed for a hingeless rotor experiencing a 100-percent power loss and for a hingeless rotor being braked from an initial operational condition corresponding to 100-percent rpm and a nominal value of zero lift. This hingeless rotor is also started up from a stopped position. Examination of the results obtained in these computations indicates that (1) reasonable aerodynamic loadings can be predicted irrespective of the radial to tangetial velocity ratio and (2) no loading or structural response phenomena result in the examined flight condition which would indicate that power loss, braking, and rotor stopping have serious consequences with respect to the creation of unusual blade-wake interaction phenomena. (Author)
AD-655 268 HC$3.00 MF$0.65

PARAMETRIC SOLUTION OF THE ONE-DIMENSIONAL FLOW EQUATIONS WITH HEAT ADDITION,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
S. S. Penner, and W. Davidor. 1967, 16p
AROD-4479:15
Grant DA-ARO (D)-31-124-G747
Availability: Published in Proceedings of the Heat Transfer and Fluid Mechanics Institute p233-46 1967.

Descriptors: (*Gas flow, Heat transfer), Differential equations, Rocket motors, Flow fields.

Heat addition in channels of variable area is discussed for the one-dimensional, inviscid flow of ideal gases with constant specific heat ratio gamma. The results are conveniently represented in parametric form showing the relation between Mach number and expansion ratio, for heat-addition rates that are specified functions of the Mach number. The flow equations are finally solved for arbitrary expansion ratios and heat-release rates with constrained throat-area ratios. (Author)
AD-655 299 Not available from CFSTI.

LINEARIZED THEORY OF A PARTIALLY CAVITATING PLANO-CONVEX HYDROFOIL INCLUDING THE EFFECTS OF CAMBER AND THICKNESS,
California Inst of Tech Pasadena Hydrodynamics Lab
For primary bibliographic entry see Field 13J.
AD-655 318 Not available from CFSTI.

NEWS OF INSTITUTIONS OF HIGHER LEARNING. AERONAUTICAL ENGINEERING: No. 1 1964, COLLECTION OF ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1B.
AD-655 358 HC$3.00 MF$0.65

THE FLOW FIELD AND HEAT TRANSFER DOWNSTREAM OF A REARWARD FACING STEP IN SUPERSONIC FLOW,
Aerospace Research Labs Wright-Patterson AFB Ohio
Howard E. Smith. Mar 67, 93p Rept no. ARL-67-0056

Descriptors: (*Supersonic flow, Heat transfer), Flow fields, Base pressure, Wake, Model tests, Reynolds number, Flow separation, Boundary layer.

An experimental investigation of the flow field, and the model pressure and steady-state heat transfer distributions for a rearward-facing step in supersonic flow is described. Tests were conducted using a water-cooled model with a step height adjustable to 0.443 and 0.750 inches at free stream Mach numbers of 2.5, 3.5, and 5.0, and at Reynolds numbers based on length of surface ahead of separation of approximately 250,000 to 1,800,000. It was found that the Reynolds number based on step height is an important parameter and that both the base pressure and the maximum heat transfer at reattachment may be predicted as a function of this parameter. Several representative flow fields are presented along with analyses of the various regions of these fields. It was found that the depressed base pressure is communicated upstream of the step through the subsonic portion of the attached boundary layer resulting in a pressure gradient immediately upstream of the step. It is shown that the rapid corner expansion is not the commonly used Prandtl-Meyer expansion, but rather is accurately described by the method of inviscid rotational characteristics which accounts for both the entropy gradient in the boundary layer and the pressure gradient upstream of the step. This description of the corner expansion also accurately predicts the position of the lip shock associated with the rapid expansion. (Author)
AD-655 370 HC$3.00 MF$0.65

STRENGTH AND DYNAMICS OF AVIATION MOTORS: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21E.
AD-655 382 HC$3.00 MF$0.65

SUFFICIENCY PROOFS FOR THE PROBLEM OF THE OPTIMUM TRANSVERSAL CONTOUR.
Revised ed.,
Rice Univ Houston Tex
Angelo Miele, and David G. Hull. 26 Sep 66, 17p
AFOSR-67-1596
Grant AF-AFOSR-828-65
Revision of manuscript submitted 18 Apr 66.

Availability: Published in SIAM J. Appl. Math. v15 n2 p464-77 Mar 1967.

Descriptors: (*Conical bodies, *Drag), (*Calculus of variations, *Inequalities), Hypersonic flow, Skin friction, Velocity, Cylindrical bodies, Geometry, Aerodynamics, Integrals, Transformations (Mathematics).

The problem of determining the transversal contour of a slender, conical body of given length and base area so as to minimize the total drag (the sume of the pressure drag and the skin-friction drag) in hypersonic flow is investigated with the indirect methods of the calculus of variations. It is assumed that the pressure coefficient is modified Newtonian and a constant value of the skin-friction coefficient is employed. It is shown that, depending on the values of the length, the base area, and the skin-friction coefficient, three classes of solutions are possible: (I) circular arcs, (II) combinations of straight line segments tangent to a basic circle, and (III) combinations of circular arcs and straight line segments tangent to the circular arcs. Sufficiency proofs for a weak relative minimum are developed without the use of the Jacobi condition. Also, sufficiency proofs for an absolute minimum are supplied for the solutions of Class II and Class III. (Author)
AD-655 399 Not available from CFSTI.

CALIBRATION OF SKIN FRICTION BALANCE DISCS FOR PRESSURE GRADIENT.
Technical rept.,
Texas Univ Austin Defense Research Lab
Harold U. Everett. Aug 58, 54p Rept no. DRL-426
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab. CF-2708.

Descriptors: (*Balances, Calibration), (*Skin friction, Balances), Disks, Pressure, Fluid flow.

The effect of a pressure gradient on skin friction balance measurements in channel flow was investigated. Three channel heights and four disc configurations were employed. A proposed correction for pressure drag on the skin friction balance disc was found to yield satisfactory agreement between measured apparent stress and theoretical apparent stress for optimum disc configuration. (Author)
AD-655 414 HC$3.00 MF$0.65

TRANSONIC FLOWS IN THE NEIGHBORHOOD OF A POINT WHERE A SHOCK WAVE MEETS THE SONIC LINE.
APL library bulletin translations series,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Paul Germain, and Georges Gillon. 16 May 67, 39p Rept no. TG-230-T520
TT-67-62394
Contract NOw-62-0604
Trans. of Congres International de Mecanique Appliquee (10th), Stressa, 31 Aug-7 Sep 60. Communications 'ONERA', n.p., 1961 p47-66.

Descriptors: (*Transonic flow, *Shock waves), Two-dimensional flow, Mathematical analysis, Theory, France.

The general outlines of the theory of homogeneous transonic flows are reviewed. Then it is shown how this theory may be applied to study of the singular behavior of a transonic flow close to a place where a shock meets a sonic line. Some examples are worked out in detail in order to show what kinds of singularities may arise in the midst of such flows. (Author)
AD-655 457 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF THE TURBULENT BOUNDARY LAYER BEHIND A FORWARD FACING STEP IN SUPERSONIC FLOW,
Texas Univ Austin Defense Research Lab
Dave Robert Moore. 17 Apr 58, 106p Rept no. DRL-425
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab. CF-2707.

Descriptors: (*Turbulent boundary layer, *Supersonic characteristics), Compressible flow, Surface roughness, Thickness, Skin friction, Drag.

The report presents the results of an experimental study of the effect of a disturbance, produced by a forward facing step, on the turbulent boundary layer in compressible flow. Boundary layer total pressure surveys and direct skin friction measurements were made at six stations on each of two test surfaces. One surface was smooth and the other surface had an 0.080-inch forward facing step. The test stations were all located downstream of the step, the height of which was approximately one-half the smooth surface boundary layer thickness. Data were obtained at Mach Numbers of 2.0, 2.5, 3.0, and 3.5 and the test Reynolds Numbers, based on momentum thickness, ranged from 8,000 to 10,000 approximately. The results of this investigation indicate that the effect of the disturbance, produced by the step on the 'law of the wall' and 'velocity defect law' profiles appears to be negligible from a point approximately 10 flat plate boundary layer thicknesses downstream from the step. (Author)
AD-655 462 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF A SIMPLIFIED METHOD FOR MEASURING HEAT TRANSFER AT SUPERSONIC SPEEDS,
Texas Univ Austin Defense Research Lab
Robert M. O'Donnell. Aug 58, 39p Rept no. DRL-427
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., CF-2709.

Descriptors: (*Supersonic flow, *Heat transfer), Measurement, Aerodynamic heating, Wind tunnel models, Flat plate models.

The investigation concerns a simplified method for measuring the heat transfer rate on a surface at supersonic speeds. Preliminary wind tunnel tests were accomplished on a flat plate model at a Mach Number of 5.0 in order to establish the feasibility of the method. The results of these tests were most encouraging; however, because only a limited number of tests were accomplished, it is practical only to conclude that the method is feasible and worthy of further consideration. Additional experimental investigations are considered necessary in order to establish some of the detail design requirements of the method. The report contains a description of the method, a detailed account of the tests accomplished, and a discussion of the results of the investigation. (Author)
AD-655 463 HC$3.00 MF$0.65

ON COMPUTATION OF FLOW PATTERNS OF COMPRESSIBLE FLUIDS IN THE TRANSONIC REGION.
Technical rept.,
Stanford Univ Calif Dept of Computer Science
Stefan Bergman, John G. Herriot, and Paul L. Richman. 7 Jul 67, 80p Rept no. CS-70
Contract Nonr-225 (37)

Descriptors: (*Transonic flow, Flow fields), (*Compressible flow, Flow fields), Boundary value problems, Initial value problems, Statistical data.

Of interest to the study are the initial and boundary value problems for compressible fluid flow. The paper deals with the numerical solution of the initial value problem.
AD-655 472 HC$3.00 MF$0.65

CONDENSATION OF SUPERSATURATED ORGANIC VAPORS IN A SUPERSONIC NOZZLE,
Massachusetts Inst of Tech Cambridge Gas Turbine Lab
Daniel B. Dawson. Apr 67, 104p Rept no. 90
Contract Nonr-3963 (07)

Descriptors: (*Gas turbine nozzles, Erosion), (*Supersonic nozzles, Condensation), (*Benzene, Condensation), (*Chloroform, Condensation), Organic materials, Nucleation, Vapors, Water vapor, Boundary layer, Drops, Predictions, Phase studies.

Experiments were performed involving condensation of supersaturated benzene and chloroform vapors in a supersonic nozzle, with compressed air as the carrier gas. Experiments showed that the magnitude of the water vapor content of the carrier air made no observable difference in the condensation behavior of either fluid. It was demonstrated that addition of small amounts of these fluids to the carrier air tended to reduce the thickness of the boundary layer in the nozzle. Comparison of experimental results with theory show, without making any adjustments to physical properties of condensate droplets to account for size, that incidence of condensation for chloroform can be predicted by the revised theory of nucleation, whereas benzene incidence can be predicted by neither revised nor classical theory. These results, combined with prior data on other fluids, show that at present neither theory seems to be generally applicable. In support of previous conclusions, the problem may well be the assumption that bulk properties may be assigned to small (30 - 50 molecules) droplets of condensate. (Author)
AD-655 473 HC$3.00 MF$0.65

ANGLE-OF-ATTACK DISTRIBUTION OF A HIGH SPEED HELICOPTER ROTOR.
Master's thesis,
Massachusetts Inst of Tech Cambridge Aeroelastic and Structures Research Lab
Paul A. Madden. 1967, 18p
AROD-4846:4
Contract DA-31-124-ARO (D)-247
Availability: Published in Unidentified journal.

Descriptors: (*Helicopter rotors, Angle of attack), Downwash, Motion, Numerical analysis, Distribution, Wake, Vortices, Aerodynamic loading, Stalling.

A numerical solution for the angle-of-attack distribution, downwash, and motion of a high speed helicopter rotor is presented. Comparison with experiment is made for longitudinal flapping of an essentially rigid teetering rotor at mu = .94. Three separate calculations of the example case were performed. The first assumed the imaginary part of lift deficiency function, or phase shift, to be zero. A constant lift curve slope was also assumed. The second included the phase shift and the constant lift curve slope was retained. The third included the phase shift and a non-linear lift curve that consisted of a constant slope to an arbitrary dynamic stall angle of 20 deg., and zero slope for higher angles. The calculated angle-of-attack contour for the mu = .94 case is presented. (Author)
AD-655 476 Not available from CFSTI.

AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF ELECTRICALLY INDUCED CONTROLLED FREQUENCY PERTURBATIONS ON BOUNDARY LAYER TRANSITION.
Technical rept.,
Ohio State Univ Research Foundation Columbus
Jeffrey J. Ketcham, and Henry R. Velkoff. Jun 67, 105p Rept no. 5
AROD-4942:4-E
Contract DA-31-124-ARO (D)-246

Descriptors: (*Boundary layer transition, *Electrical corona), Frequency, Perturbation theory, Control, Laminar boundary layer, Flat plate models, Leading edge.

An experimental investigation was conducted to determine the effects of corona discharge on boundary-layer transition. A flat plate was mounted in a low-turbulence wind tunnel. The location of transition was determined using a near-surface impact pressure probe. Boundary-layer excitation was accomplished by suspending a series of corona wires parallel to the plate outside the boundary layer. It was found that, under certain conditions, the transition point could be moved downstream upon application of a steady potential to the wires. Superposition of a pulsating potential did not influence the results over a wide range of pulsation frequency. (Author)
AD-655 526 HC$3.00 MF$0.65

EFFECT OF NONZERO Pr sub m ON HYDROMAGNETIC AIRFOIL THEORY,
Cornell Univ Ithaca N Y
G. S. S. Ludford, and D. W. Yannitell. 19 Jan 67, 5p
AROD-5329:9
Contract DA-31-124-ARO (D)-325
Availability: Published in AIAA Journal v5 n6 p1211-2 1966.

Descriptors: (*Airfoils, *Magnetohydrodynamics), (*Prandtl number, Airfoils), Theory, Equations.
Identifiers: Alfven waves.

Recently there has been interest in nondissopative liquids with finite Pr sub m. The note discusses the effect of finite Pr sub m on the airfoil problem. The new boundary condition requires the emission of a finite Alfven wave followed by a completely different transient. It is found that the steady-state limits are unaffected, in contrast to Sears' result for crossed fields. (Author)
AD-655 550 Not available from CFSTI.

BOUNDARY LAYER OVER A THIN NEEDLE.
Revised ed.,
Minnesota Univ Minneapolis
Lawrence L. Lee. 20 Jan 67, 3p
Contract Nonr-710 (40)
Revision of manuscript submitted 10 Oct 66.
Availability: Published in The Physics of Fluids v10 n4 p820-2 Apr 1967.

Descriptors: (*Boundary layer, Slender bodies), (*Slender bodies, Incompressible flow), Equations of motion, Bodies of revolution, Numerical analysis, Drag, Parabolic bodies.

An equation governing the motion of an incompressible fluid flowing axially over a thin paraboloid of revolution is derived. The asymptotic behaviors and an approximate solution are discussed, and numerical solutions computed. From the numerical solutions, an extrapolation towards vanishing boundary thickness is made. It is found that for progressively thin needles, the displacement thickness and drag per unit length diminish very slowly, but eventually become zero as the needle vanishes. (Author)
AD-655 558 Not available from CFSTI.

DRAG OF BLUNT BODIES IN POLYMER SOLUTIONS,
Naval Ordnance Test Station China Lake Calif
T. G. Lang, and H. V. L. Patrick. Jul 67, 22p
Rept no. NOTS-TP-4379
Presented at the Winter Annual Meeting and Energy Systems Exposition, New York, N. Y., 27 Nov-1 Dec 66.
Availability: Hard copy available from American Society of Mechanical Engineers, United Engineering Center, 345 East 47th St., New York, N. Y., 10017. Rept. no. 66-WA/FE-33, $1.50.

Descriptors: (*Blunt bodies, Drag), (*Polymers, *Lubricants), (*Epoxy plastics, Additives), Molecular weight, Conical bodies, Disks, Spheres, Cylindrical bodies, Wake, Flow separation, Boundary layer, Reduction.
Identifiers: Drag-reducing fluids.

Experiments were conducted to determine the effect of high-molecular-weight polymer additives on the drag of cones, disks, spheres, and cylinders. Drop tests were performed in plain water, and in poly (ethylene oxide) (Polyox WSR-301) solutions of 200 and 1000 ppm by weight. Test results showed that sphere drag was reduced by as much as 69 percent, while the drag of the other models were, at most, only slightly reduced by the additives. Dyed-wake photographs of falling spheres showed that the additives could alter markedly the shape of the wake by shifting the point of boundary-layer separation rearward. (Author)
AD-655 616 MF$0.65

QUASI-SYNOPTIC MONTHLY HYDROGRAPHY OF THE TRANSITION REGION BETWEEN COASTAL AND SLOPE WATER SOUTH OR CAPE COD, MASSACHUSETTS.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 8J.
AD-655 639 HC$3.00 MF$0.65

THE UNIQUENESS OF CERTAIN FLOWS IN A CHANNEL WITH ARBITRARY CROSS SECTION,
New York Univ N Y Courant Inst of Mathematical Sciences
Arthur S. Peters. Jun 67, 45p Rept no. IMM-355
Contract Nonr-285 (55)

Descriptors: (*Fluid flow, Three-dimensional flow), Shear stresses, Two-dimensional flow, Velocity, Mathematical analysis.

The report presents a proof of the uniqueness of a parallel three-dimensional shear flow in a channel with arbitrary cross section where the speed of the flow is not less than the highest critical speed. The investigation also includes a two-dimensional analysis in which it is assumed that while the flow velocity varies with the depth, the density also depends on the depth; and for this case the development leads to a formula which gives a good approximation to the highest critical speed. (Author)
AD-655 643 HC$3.00 MF$0.65

A NUMERICAL SOLUTION OF THE BOLTZMANN EQUATION FOR A TWO-DIMENSIONAL GAS,
California Univ Berkeley Div of Aeronautical Sciences
Frank Robben. Apr 67, 42p Rept no. AS-67-4
Contract Nonr-222 (45), Grant AF-AFOSR-538-67

Descriptors: (*Two-dimensional flow, Numerical analysis), Equations of motion, Gas flow, Integral equations, Nonequilibrium flow.

An attempt to solve the Boltzmann equation numerically was carried out by means of a more direct method than the Monte-Carlo technique. The initial value problem of the energy relaxation of a two-dimensional gas of hard spheres was studied, using direct numerical integration techniques. A finite difference approximation to the Boltzmann equation was used. While the results are qualitatively correct, conservation of energy and number were violated to the extent of about 4% per collision. On comparing the detailed results to that predicted by a Krook model, quantitative differences are noted. It is believed that the inaccuracies of the solutions obtained are due to a singularity in the collision integrals. (Author)
AD-655 647 HC$3.00 MF$0.65

ANALYSIS AND USER'S MANUAL FOR IMPLICIT FINITE-DIFFERENCE COMPUTER PROGRAM FOR LAMINAR COMPRESSIBLE BOUNDARY LAYER CALCULATIONS.
Technical rept.,
General Applied Science Labs Inc Westbury N Y
F. Lane, E. Lieberman, and H. Fox. 29 Nov 66, 110p Rept no. GASL-TR-629
Contract AF 33 (615)-2568

Descriptors: (*Laminar boundary layer, Computer programs), Compressible flow, Differential equations, Reynolds number, Equations of state, Axially symmetric flow, Instruction manuals, Two-dimensional flow.

An IBM 7090/94 computer program to calculate flow properties within boundary layers, for an 'ideal' compressible gas, was completed. The governing differential equations are approximated by an implicit finite-differencing scheme which is posed directly in (nondimensionalized) physical coordinates; the streamwise coordinate is scaled with respect to a reference length, while the normal coordinate is so scaled and also stretched by the square root of a reference Reynolds number. The program is designed for bodies that are either two-dimensional or axisymmetric and the gas (air) is considered to be calorically perfect according to the equation of state, p = rho RT. Initial data through the boundary layer must be prescribed, as well as the streamwise variation of pressure, and of either wall temperature, T sub w' or the gradient of T sub w normal to the wall, partial T sub w/partial y. A boundary layer of zero thickness at the initial station may also be accommodated. All inputs are specified in physical coordinates. (Author)
AD-655 681 HC$3.00 MF$0.65

SOUND GENERATION BY SHOCK-VORTEX INTERACTION,
Syracuse Univ N Y
For primary bibliographic entry see Field 20A.
AD-655 713 Not available from CFSTI.

THE MOTION OF LIQUID INSIDE A CLOSED VIBRATING VESSEL,
Vermont Univ Burlington
W. L. Nyborg, and A. Rodgers. 1961, 24p
AFOSR-67-1634
Contract AF 49 (638)-968, Grant AF-AFOSR-62-67
Prepared in cooperation with Oxford Univ. (England). Prepared for presentation in part at Acoustical Society of America meeting (62nd), Cincinnati, Ohio, 1961.
Availability: Published in Biotechnology and Bioengineering v9 p235-56 1967.

Descriptors: (*Cells (Biology), Degradation), (*Fluid dynamic properties, Liquids), (*Liquids, Vibration), Oscillation, Pulse generators, Bubbles, Flow visualization, Containers, Cavitation, Acoustics, Water, Air, Turbulence, Shear stresses.

Studies are made of the behavior of liquid contents in a closed cylindrical vessel vibrated vertically along its axis. By use of motion pictures it was found that surface waves develop, sonic fog is produced, and air bubbles are formed at the onset of the motion. Bubbles then move downward until, under conditions of practical interest, air is divided equally between top and bottom of the vessel. Steady-state vertical oscillation of the central liquid body then ensues, superposed on turbulent action of air-water mixtures at the top and bottom of the vessel. Reference is made to available theory for surface wave excitation, and bubble migration. A nonlinear differential equation is considered for the steady-state oscillation. (Author)
AD-655 749 Not available from CFSTI.

PRACTICAL ASPECTS OF CALCULATING SKIN FRICTION COEFFICIENTS BY COLE'S THEORY OF COMPRESSIBLE TURBULENT FLOWS,
Rand Corp Santa Monica Calif
J. L. Raymond, and J. V. McGann-Lamar. Jul 67, 57p Rept no. RM-5260-PR
Contract F44620-67-C-0045

Descriptors: (*Skin friction, Turbulence), Turbulent boundary layer, Theory, Reynolds number, Drag, Aerodynamic characteristics, Compressible flow, Flat plate models.

Coles' theory for the turbulent boundary layer in a compressible fluid is used to compute curves of skin friction coefficient versus Reynolds number. The Mach numbers and wall-temperature ratios selected provide sufficient information for rapid estimation of turbulent skin friction drag for flat plates with zero pressure gradient. These results, though limited in scope and unverified experimentally for conditions outside the range of data originally considered by Coles, nevertheless provide the practicing aerodynamicist with a relatively simple means of estimating the flat-plate skin friction for airplane or missile components having compressible turbulent boundary layers. Coles' theoretical hypotheses, partly based on experimental data, may be of significant value in improving upon the more exclusively empirical treatments of the past. While not difficult to interpret, Coles' equations are mathematically complex and contain thought-provoking physical reasoning. In addition to the calculations of skin friction, the study includes a discussion of Coles' classical theory and an interpretation of it for practicing aerodynamicists. The machine program for JOSS, The RAND Corporation's on-line interactive computing system, is included. (Author)
AD-655 766 HC$3.00 MF$0.65

ACOUSTIC ENERGY FLUX FROM SHOCK-TURBULENCE INTERACTION.
Toronto Univ (Ontario) Inst for Aerospace Studies
For primary bibliographic entry see Field 20A.
AD-655 795 HC$3.00 MF$0.65

INVERSE COMPUTATION OF SUPERSONIC INVISCID FLOW FIELDS WITH IMBEDDED SHOCKS: ANALYSIS AND USER'S MANUAL.
Technical memo.,
General Applied Science Labs Inc Westbury N Y
Michael Abbett. 30 Nov 66, 83p Rept no. GASL-TM-156
Contract AF 33 (615)-2568

Descriptors: (*Supersonic flow, Flow fields), Shock waves, Compressible flow, Two-dimensional flow, Axially symmetric flow, Mathematical analysis, Instruction manuals.

A program was developed to compute the steady supersonic flow field of an inviscid, non-homenergetic, non-homentropic, compressible, calorically and thermally perfect gas which may or may not have imbedded shocks. The flow field may be either two-dimensional or axisymmetrical (without swirl). The inception of imbedded shocks is detected by the coalescence of characteristics. In addition to computing the creation and development of several such shocks of the same family, the program computes the interaction and continuation of these shocks when they intersect. A maximum of five such shocks can be handled simultaneously, although this limit can be considerably increased with minor modifications. (Author)
AD-655 806 HC$3.00 MF$0.65

ON THE DIFFERENTIAL EQUATION APPROXIMATION IN RADIATIVE GAS DYNAMICS.
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20M.
AD-655 813 HC$3.00 MF$0.65

A DESCRIPTION OF FOUR WIND-TUNNEL DYNAMIC MEASURING TECHNIQUES.
David Taylor Model Basin Washington D C Aerodynamics Lab
For primary bibliographic entry see Field 14B.
AD-655 825 HC$3.00 MF$0.65

AERODYNAMIC BEHAVIOR OF HYPERBOLOIDAL ANTENNA STRUCTURES.
Naval Academy Annapolis Md Dept of Engineering
For primary bibliographic entry see Field 9E.
AD-655 832 HC$3.00 MF$0.65

SPACE-TIME CORRELATIONS OF VELOCITY AND PRESSURE AND THE ROLE OF CONVECTION FOR HOMOGENEOUS TURBULENCE IN THE UNIVERSAL RANGE.
Technical rept.,
Trg Inc Melville N Y
David M. Chase. Apr 67, 131p Rept no. TRG-011-TN-67-1
Contract Nonr-4385 (00)

Descriptors: (*Turbulence, Correlation techniques), Velocity, Pressure, Scattering, Convection (Heat transfer), Mathematical analysis.

Kolmogorov's principles provide a basis for the treatment of Eulerian space-time correlations for turbulence in the universal range by explicit separation of the kinematic effect of convection by the large eddies. With reference to unsheared homogeneous turbulence, the usual similarity forms are assumed for intrinsic velocity correlations in a local co-moving frame. The local-convection approximation, neglecting dispersion in this frame and hence relating space-time correlations to pure spatial correlations, is indicated to be a useful one in the inertial and viscous subranges. For an isotropic normal velocity distribution, the structure functions of fluctuating velocity are computed and found to be nearly space-time isotropic in the former subrange and exactly so in the latter. (Author)
AD-655 841 HC$3.00 MF$0.65

INVESTIGATIONS OF FLOWS ABOUT MODELS OF AERODYNAMIC BODIES IN A HYDRAULIC ANALOGY TANK.
Deutsche Forschungsanstalt Fuer Luft- Und Raumfahrt, Stuttgart (West Germany).
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 17.
N67-30446 HC$3.00 MF$0.65

BUBBLE DYNAMICS IN VIBRATED LIQUIDS UNDER NORMAL AND SIMULATED LOW GRAVITY ENVIRONMENTS.
Southwest Research Inst., San Antonio, Tex. Dept. of Mechanical Sciences.
W.-H. Chu, and D. D. Kana. 15 Feb 67, 65p NASA-CR-85575, TR-8
Contract NAS8-11045

Descriptors: *Bubble, *Dynamics, *Environment simulation, *Vibration effect, Effect, Environment, Excitation, Finite, Frequency, Horizontal, Liquid, Low gravity, Oscillation, Random, Simulation, Size, Tank, Vertical, Vibration.

For abstract, see STAR 05 17.
N67-30501 HC$3.00 MF$0.65

CONTRIBUTION TO THE THEORY OF FLOWS INCLUDING CHEMICAL REACTIONS.
France. Office National D Etudes Et de Recherches Aeronautiques, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 17.
N67-30553 HC$3.00 MF$0.65

NON-IDEAL MGD FLOWS IN BOUNDARY LAYER APPROXIMATION.
Innsbruck Univ. (Austria). Inst. for Theoretical Physics.
For primary bibliographic entry see Field 20I.
For abstract, see STAR 05 17.
N67-30657 HC$3.00 MF$0.65

HEAT TRANSFER MEASUREMENTS ON A LOW-FINENESS- RATIO CYLINDER AT A MACH NUMBER OF 10.4 AND ANGLES OF ATTACK FROM 0 DEG TO 90 DEG.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 17.
N67-30743 HC$3.00 MF$0.65

STING-SUPPORT INTERFERENCE ON LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF CARGO-TYPE AIRPLANE MODELS AT MACH 0.70 TO 0.84.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
D. L. Loving, and A. A. Luoma. Jul 67, 59p NASA-TN-D-4021
Contract 126-13-01-39-23

Descriptors: *Aerodynamic characteristics, *Aircraft model, *Fuselage, *Pressure tube, *Transport aircraft, Aerodynamic, Aft, Aircraft, Cargo, Characteristics, Coefficient, Drag, Interference, Lift, Longitudinal, Model, Pressure, Sting, Strut, Support, Surface, Transonic, Transport, Tube, Upswept.

For abstract, see STAR 05 17.
N67-31054 HC$3.00 MF$0.65

FULL-SCALE INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A MODEL EMPLOYING A SAILWING CONCEPT.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
M. P. Fink. Jul 67, 30p NASA-TN-D-4062
Contract 126-13-01-60-23

Descriptors: *Aerodynamic characteristics, *Aspect ratio, *Sailwing, *Scale model, Aerodynamic, Aircraft, Airfoil, Angle of attack, Aspect, Characteristics, Control, Device, Drag, Full, Lateral, Lift, Model, Ratio, Scale, Stall, Wing.

For abstract, see STAR 05 17.
N67-31143 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF LIQUID SURFACE MOTION IN RESPONSE TO LATERAL ACCELERATION DURING WEIGHTLESSNESS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
W. J. Masica. Jul 67, 28p NASA-TN-D-4066
Contract 124-09-03-01-22

Descriptors: *Acceleration, *Cylinder, *Interface stability, *Liquid-vapor interface, Amplitude, Bond, Constant, Duration, Interface, Lateral, Liquid, Motion, Number, Oscillation, Stability, Surface, Time, Transverse, Vapor, Viscosity.

For abstract, see STAR 05 17.
N67-31381 HC$3.00 MF$0.65

PRESSURE FLUCTUATIONS ON A FLAT PLATE WITH OBLIQUE JET IMPINGEMENT.
Toronto Univ. (Ontario).
W. T. Chu, T. E. Siddon, and D. R. Strong. Jul 67, 30p NASA-CR-839, TN-107
Grant NSG-661

Descriptors: *Acoustic fatigue, *Dynamic response, *Flat plate, *Jet impingement, *Surface pressure, Acoustic, Analysis, Boundary, Correlation, Density, Dynamic, Fatigue, Field, Flat, Fluctuation, Impingement, Jet, Layer, Level, Measurement, Near, Oblique, Plate, Power, Pressure, Response, Simulation, Space, Spectral, Surface, Time, Turbulent.

For abstract, see STAR 05 17.
N67-31478 HC$3.00 MF$0.65

20E. Masers and Lasers

ULTRASONIC LASER MODULATION TECHNIQUES.
Quarterly progress rept. no. 1, 1 Jul-30 Sep 64,
United Aircraft Corp., East Hartford, Conn.
A. J. DeMaria, D. E. Flinchbaugh, and G. E. Danielson, Jr. 11 Jan 65, 55p C9202593
Contract DA-28-043-AMC-00259 (E)

Descriptors: (*Lasers, Modulation), Research program administration, Amplitude modulation, Frequency modulation, Phase modulation, Deflection, Ultrasonic radiation, Helium, Neon, Diffraction, Refraction, Mathematical analysis, Integration, Integral equations.

The equivalence of the phase modulation index of a light beam and the Raman-Nath parameter of an acoustic diffraction grating is developed. The diffraction integral for an amplitude modulated acoustic wave is solved. The solution reverts to the Raman-Nath result when the amplitude modulation index goes to zero. (Author)
AD-454 484 HC$3.00

LASER OSCILLATION ON ELECTRONIC TRANSITIONS IN NEUTRAL N2 AND CO,
Texas Univ Austin Dept of Electrical Engineering
R. B. Allen, T. F. Whittaker, and A. A. Dougal.
1967, 11p
AFOSR-67-1585
Grant AF-AFOSR-766-67
Availability: Published in 1967 SWIEEECO RECORD nF-72 p5-1-1-8 Apr 19 1967.

Descriptors: (*Gas lasers, Molecular energy levels), (*Nitrogen, Gas lasers), (*Carbon monoxide, Gas lasers), Band spectrum, Electron transitions, Gas discharges, Discharge tubes, Helium group gases, Impurities.

An experimental study of laser action in the N2 Second Positive band system (C (3)Pi-u to B (3)Pi-g), the N2 First Positive band system (B (3)Pi-g to A (3)Sigma-u+), and the CO Angstrom band system (B (1)Sigma+ to A (1)Pi) is made. Conventional, coaxial, and crossed-field laser discharge tube geometries are used. The effect of various rare gas mixtures on the N2 and CO laser output is investigated and experimental results are presented. (Author)
AD-655 213 Not available from CFSTI.

FOREIGN SCIENCE BULLETIN, VOL. 3, NO. 6, 1967.
Library of Congress Washington D C Aerospace Technology Div
Jun 67, 60p
TT-67-62359
A Monthly Review of Selected Foreign Scientific and Technical Literature. Also available on subscription, $36.00/yr. See also AD-654 303.

Descriptors: (*Chelate compounds, *Lasers), (*Helium, Reviews), (*Cryogenics, Reviews), (*Scientific organizations, USSR), (*Scientific personnel, Hungary), Rare earth compounds, Metal films, Magnetic properties, Gas lasers, Atmospherics, Predictions, Seismology, Cosmic rays, Vacuum, Terrestrial magnetism, Symposia.

Contents. Full-length paper: Rare-earth element chelates as active laser materials. Surveys: Helium in the USSR; Investigations in the field of low-temperature physics; The State Committee for Science and Technology in the USSR; A profile of the research worker in Hungary. Notes: Field rotation noise in magnetic thin films; High-intensity molecular gas lasers; Soviet short-range radio forecasting service; The development and present state of seismological investigations and seismological service in Hungary. Conferences: All-Union Conference on the Physics of Cosmic Rays; Conference on the Physics and Technology of High and Ultrahigh Vacuum; Conference on Seismology Held in Leningrad; The Fifth All-Union Conference on the Permanent Geomagnetic Field and Paleomagnetism.
AD-655 339 HC$3.00 MF$0.65

INVESTIGATION OF THE VARIABLES CONTROLLING THE FLUX GROWTH OF HIGH QUALITY LASER CRYSTALS.
American Science and Engineering Inc Cambridge Mass
For primary bibliographic entry see Field 20B.
AD-655 388 HC$3.00 MF$0.65

HELIUM-NEON LASER DISCHARGE PARAMETER STUDY.
Master's thesis,
Naval Research Lab Washington D C
Wayne T. Whitney. 21 Jun 67, 51p Rept no. NRL-6536

Descriptors: (*Gas lasers, *Atomic energy levels), Helium, Neon, Gas discharges, Electron transitions, Line spectrum, Pressure.

An experimental study was made to determine which energy level is dominant in limiting the output power of the helium-neon laser. This was done by comparing laser power versus discharge current data for the three main laser transitions, with the temperature and pressure as parameters. Such a comparison is informative because two of the laser transitions (0.6328 and 3.39 microns) share a common upper level (3s2); and two (0.6328 and 1.15 microns) share a common lower level (2p4). Relative saturation behavior indicates that at low pressures the upper level population rate controls the output power of all three laser lines; and at high pressures (above 1 torr) the lower level depopulation rate is more important for the 0.63 and 1.15 microns lasers. The optimum pressure for maximum output of the 0.6328 micron laser occurs at an intermediate pressure (0.7 torr) where both effects are important. All of the data were taken on the same tube, (8 mm. i.d.), utilizing ultra high vacuum techniques to maintain gas purity. It was found that an increase in the laser tube wall temperature will produce an increase in laser power at high pressures (as much as 500% for 1.15 microns); but will decrease the power at low pressures. Also of interest in the data is the fact that the 1.15 micron line can be made to oscillate at total pressures at least as high as 20 torr. (Author)
AD-655 437 HC$3.00 MF$0.65

STIMULATED EMISSION FROM THE UPPER HYBRID RESONANCE IN A MAGNETO-PLASMA.
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 20I.
AD-655 450 HC$3.00 MF$0.65

A DIGITAL LASER RANGEFINDER FOR DATA ACQUISITION,
Naval Ordnance Test Station China Lake Calif
For primary bibliographic entry see Field 17H.
AD-655 667 Not available from CFSTI.

A BIBLIOGRAPHY OF LASER APPLICATIONS.
Special reports no. 62,
Air Force Cambridge Research Labs L G Hanscom Field Mass
C. Martin Stickley, and Arthur Gingrande. Apr 67, 46p Rept no. AFCRL-67-0223

Descriptors: (*Lasers, Bibliographies), Measurement, Light communication systems, Opdar, Instrumentation, Chemistry, Photography, Material forming.

The bibliography of laser applications contains 644 entries from the open literature for the period 1961 through September 1966. The entries are divided into the following major areas: mechanical measurements and standards; communications applications; radar and tracking applications; military applications; optical signal processing; interferometry and testing of optical components; applications to scientific studies; applications in chemistry; photographic applications; metalworking; and miscellaneous applications. The entries are further subdivided into 78 other categories. Applications in medical and biological research are not included; complete coverage in the other areas is not guaranteed. Under some topics (detection techniques, spectroscopy, interaction with acoustic waves, plasma diagnostics, nonlinear optics, gas breakdown, scattering, holography) so much has been published that only review articles, articles of major importance, and very recent articles could be included. (Author)
AD-655 774 HC$3.00 MF$0.65

RECEIVER TECHNIQUES AND DETECTORS FOR USE AT MILLIMETER AND SUBMILLIMETER WAVE LENGTHS SEMIANNUAL STATUS REPORT.
Ohio State Univ., Columbus. Electroscience Lab.
C. A. Levis. 4 May 67, 13p NASA-CR-84863, REPT.-1093-35
Grant NSG-74-60

Descriptors: *Carbon dioxide, *Excitation, *Laser, *Wave function, Calculation, Carbon, Constant, Cross section, Differential, Dioxide, Eigenstate, Equation, Force, Function, Hamiltonian, Infrared, Linear, Molecule, Vibration, Wave.

For abstract, see STAR 05 17.
N67-30815 HC$3.00 MF$0.65

THE EFFECTS OF BUFFER GAS PRESSURE AND CONCENTRATION ON HOLE BROADENING IN GAS LASER SYSTEMS.
Technical rept.,
Utah Univ., Salt Lake City. Microwave Device and Physical Electronics Lab.
Maylin H. Dittmore, and Richard W. Grow. Jan 67, 167p NSF-10
Grant NSF-GK-29

Descriptors: (*Gas lasers, Excitation), Doppler effect, Atomic energy levels, Models (Simulations), Neon, Helium, Mathematical analysis.

The effects of thermal elastic collisions on upper state excited atoms in a laser system are considered. A model, wherein the atoms are considered to be smooth, frictionless spheres, is employed in a classical treatment of the thermal collisions. The probability of an excited atom being transferred from one position on the inhomogeneously broadened distribution to another is calculated. A periodic approximation of the error integral is used to simplify the expression for the transfer probability. Computer solutions for the two cases of Ne-He collisions and Ne-Ne collisions are carried out. From the transfer probability functions the broadening of the natural line width due to hard collisions and the broadening of the holes in the excited atomic distribution due to soft collisions are calculated. It is shown that broadening due to soft collisions is much greater than that due to hard collisions in the 6328A Ne-He laser system. Meas-

urements of hole widths using the concentration ratio and total pressure as parameters are made on the 6328A Ne-He laser system. Measurements are found to agree quite well with the calculations.
PB-174 936 HC$3.00 MF$0.65

20F. Optics

THE RELATION BETWEEN SKY BRIGHTNESS AND INTERFEROMETER OUTPUT.
Cornell Univ., Ithaca, N. Y.
For primary bibliographic entry see Field 17C.
AD-244 478 HC$3.00

EXPERIMENTAL TEST OF THE FREUNDLICH RED-SHIFT HYPOTHESIS,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 3B.
AD-655 209 Not available from CFSTI.

TEMPERATURE-MODULATED REFLECTANCE OF GOLD FROM 2 TO 10 eV.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20J.
AD-655 328 Not available from CFSTI.

RESEARCH ON RELATIONS BETWEEN COMETARY, SOLAR AND UPPER ATMOSPHERIC PROCESSES.
Liege Univ (Belgium) Dept of Astrophysics
For primary bibliographic entry see Field 3B.
AD-655 385 HC$3.00 MF$0.65

A NEW SPECTROPHOTOMETER FOR MEASURING ULTRAVIOLET SKY BRIGHTNESS AND DIRECT SOLAR RADIATION.
Final scientific rept. 1 Jan 63-31 Dec 66,
Physikalisch-Meteorologisches Observatorium Davos Davos-Platz (Switzerland)
P. Bener. Apr 67, 156p
AFCRL-67-0410
Contract AF 61 (052)-618

Descriptors: (*Spectrophotometers, Design), (*Sky brightness, Measurement), (*Solar radiation, Measurement), (*Scattering, Atmosphere), Spectra (Visible + ultraviolet), Optical instruments, Polarization, Photons, Photomultipliers, Sensitivity, Accuracy, Calibration, Photosensitivity.

A transportable spectrophotometer for measuring ultraviolet sky brightness and solar radiation from 295 to 400 millimicrons is described. This instrument serves for a study of atmospheric scattering by comparing measured and theoretical values of intensity. Its main components are: A double monochromator Zeiss MM 12, a telescope, a photomultiplier enclosed in a cooling box and a mounting for following the sun and scanning the sky according to the astronomical and horizontal system respectively. Neutral attenuation filters are applied to bridge the interval of brightness (100,000) between sun and sky and to adapt the sensitivity to the varying sky brightness. The components of sky brightness polarized parallel and normal to the entrance slit are measured separately. An effective spectral bandwidth between 0.9 and 2.5 millimicrons is normally applied. Mean values of the signal current are measured by means of a Keithley 610 A electrometer and a voltage-to-frequency converter. Photon counting is applied for the lowest levels of intensity. The overall accuracy amounts to plus or minus 7% for intensity and to plus or minus 3% to 5% for the ratio between sky brightness and solar radiation.
AD-655 394 HC$3.00 MF$0.65

NUMBER DENSITY DETERMINATION IN THE ATMOSPHERE OF O2, H2O AND CO2 GAS CONSTITUENTS BY USE OF A HIGH INTENSITY LASER BEAM,
Texas Univ Austin Dept of Electrical Engineering
For primary bibliographic entry see Field 4A.
AD-655 401 Not available from CFSTI.

UNIFORM ASYMPTOTIC EXPANSIONS OF INTEGRALS WITH STATIONARY POINT NEAR ALGEBRAIC SINGULARITY,
New York Univ N Y Courant Inst of Mathematical Sciences
For primary bibliographic entry see Field 12A.
AD-655 491 Not available from CFSTI.

CODED RETICLES FOR FIXED-FIELD IMAGING SYSTEMS,
Michigan Univ Ann Arbor Inst of Science and Technology
S. Sternberg, J. Snell, and R. Nalepka. Jul 67, 37p Rept no. 6400-113-T
ECOM-00013-113
Contract DA-28-043-AMC-00013 (E)

Descriptors: (*Reticles, Optical images), (*Infrared detectors, Reticles), Mathematical models, Matrix algebra, Combat surveillance, Images, Coding, Scanning.
Identifiers: Michigan project.

A particular class of imaging systems which produces a visible two-dimensional image of an object scene emitting or reflecting radiation in the infrared spectral region is discussed. Systems in this class produce an electrical signal proportional to a linear combination of resolution element intensities. The weightings imposed on the resolution element intensities are determined by the transmittance of a reticle placed in the image plane of the system's primary focusing optics. Time-varying weightings result from translations of the reticle within the image plane. The well-known continuous mathematical model of this type of system is reviewed, and its limitations are discussed. Then an alternate mathematical model is presented. This model defines the object scene, the electrical signal, and the final image as finite-dimensional vectors. The coding and decoding operations of the reticles are represented by matrices which transform the vector spaces containing these vectors. Designing reticle patterns is reduced to the problem of finding matrices which satisfy requirements insuring that the reticles will be realizable and capable of imaging the object scene. These requirements are discussed, and certain types of matrices which satisfy them are presented. (Author)
AD-655 502 HC$3.00 MF$0.65

MODEL STELLAR ATMOSPHERES.
Texas Univ Austin Dept of Astronomy
For primary bibliographic entry see Field 3B.
AD-655 663 HC$3.00 MF$0.65

CRYSTAL SYMMETRY, OPTICAL PROPERTIES, AND FERROELECTRIC POLARIZATION OF Bi4Ti3O12 SINGLE CRYSTALS.
Air Force Avionics Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20L.
AD-655 688 Not available from CFSTI.

FUNCTIONAL EVALUATION OF ELECTROLUMINESCENT PICTORIAL STATUS DISPLAYS.
North American Aviation Inc Anaheim Calif Autonetics Div
For primary bibliographic entry see Field 21D.
AD-655 690 HC$3.00 MF$0.65

GRAVITATIONAL CLINOMETER.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8B.
AD-655 707 HC$3.00 MF$0.65

DIFFRACTION BY FIBER MOSAICS,
Optics Technology Inc Palo Alto Calif
R. E. Wilcox. 5 Oct 66, 3p
AFOSR-67-1699
Contract AF 49 (638)-1626
Availability: Published in Applied Optics, v6 p582 Mar 1967.

Descriptors: (*Fiber optics, Diffraction), (*Coherent radiation, Fiber optics), Gas lasers, Scattering, Models (Simulations), Pattern recognition.

This report describes experiments with arrays of fiber optics elements using coherent light. A model is developed from the diffraction patterns obtained which is directly analagous to ordered antenna arrays for which complete analyses are available from communication sciences. The conclusion is drawn that improvements in random dephasing effects must be made before satisfactory performance is attained before the potential of coherent sources can be obtained with fiber arrays. (Author)
AD-655 751 Not available from CFSTI.

SELF MODULATING, DERIVATIVE OPTICAL SPECTROSCOPY. PART II. EXPERIMENTAL,
National Electrotechnical Inst Turin (Italy)
For primary bibliographic entry see Field 14B.
AD-655 758 Not available from CFSTI.

THE CONCEPT OF A TWO-DIMENSIONAL LENSLESS INCOHERENT OPTICAL CORRELATOR,
Navy Underwater Sound Lab New London Conn
Edward S. Eby. 12 Jul 67, 12p Rept no. USL-828

Descriptors: (*Correlators, Optical equipment), Signals, Processing, Correlation techniques, Optical images.

The simplest conceptual realization of a two-dimensional lensless incoherent optical correlator is introduced. In this naive model, the correlation function is located at infinity and permits only serial recording. A more sophisticated model of a lensless correlator is then developed which permits simultaneous recording of the correlation function located at finite distance. The theory is valid within the limitations of ray theory. (Author)
AD-655 822 HC$3.00 MF$0.65

A STUDY OF SOME CHARACTERISTICS OF ATMOSPHERIC REFRACTIVE INDEX DIFFERENCES.
Texas Univ., Austin. Electrical Engineering Research Lab.
J. L. David, A. P. Dean, and A. W. Straiton. 15 May 67, 146p NASA-CR-85871, P-15
Contract NGR-44-012-048

Descriptors: *Atmospheric refraction, *Meteorology, *Refractive index, Amplitude, Analysis, Atmospheric, Data, Difference, Distribution, Function, Index, Instrumentation, Mathematics, Measurement, Model, Processing, Refraction, Refractometer, Spectral, Structure.

For abstract, see STAR 05 17.
N67-31116 HC$3.00 MF$0.65

USE OF THE FABRY- PEROT INTERFEROMETER IN THE DETERMINATION OF THE INSTRUMENTAL FUNCTION OF A SPECTROGRAPHIC DEVICE.
Scientific Translation Service, La Canada, Calif.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 17.
N67-31189 HC$3.00 MF$0.65

MEASUREMENT OF THE EINSTEIN EFFECT AND OTHER MEASUREMENTS REQUIRING

EXTREMELY ACCURATE DETERMINATION OF STELLAR POSITIONS OR MOTIONS.
Minnesota Univ., Minneapolis. Tycho Study Group./
H. Suhl. Aug 66, 21p NASA-CR-85826, TG-29
Contract NSR-24-005-047

Descriptors: *Brownian motion, *Deflection, *Micrometeorology, *Spacecraft tracking, Deviation, Elasticity, Gradient, Gravitational, Impact, Light, Measurement, Meteor, Motion, Photon, Pressure, Radiation, Spacecraft, Stability, Star, Theory, Tracking, Vibration.

For abstract, see STAR 05 17.
N67-31212 HC$3.00 MF$0.65

SOLAR PERFORMANCE EVALUATION TEST PROGRAM OF THE 9.5-FT-DIAM. ELECTROFORMED NICKEL CONCENTRATOR S/N 1 AT TABLE MOUNTAIN, CALIFORNIA.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
F. A. Blake. 15 Jun 67, 40p NASA-CR-85750, JPL-TM-33-206
Contract NAS7-100

Descriptors: *Nickel, *Optical reflectivity, *Paraboloidal mirror, *Power supply, *Solar generator, *Thermal power, Calibration, Calorimetry, Cavity, Concentrator, Focus, Generator, Metal, Mirror, Optical, Paraboloid, Performance, Power, Reflection, Solar, Supply, Test, Thermal, Thermionic, Zone.

For abstract, see STAR 05 17.
N67-31438 HC$3.00 MF$0.65

THE OCULOMETER.
Honeywell, Inc., Boston, Mass.
J. Merchant. Jul 67, 168p NASA-CR-805
Contract NASW-1159

Descriptors: *Data acquisition, *Electro-optics, *Eye movement, *Optical tracking, Acquisition, Boundary, Cornea, Data, Design, Direction, Equipment, Eye, Iris, Light, Measurement, Movement, Ocular, Optical, Pupil, Reflection, Tracking.

For abstract, see STAR 05 17.
N67-31481 HC$3.00 MF$0.65

20G. Particle Accelerators

VARIABLE ENERGY EXTRACTION FROM A NEGATIVE ION CYCLOTRON AND RELATED MEASUREMENTS.
Technical rept.,
California Univ Los Angeles Dept of Physics
Arthur C. Paul. Jun 67, 204p Rept no. P-79
Contract Nonr-233 (44)

Descriptors: (*Cyclotrons, Operation), (*Proton beams, Particle trajectories), Particle accelerator techniques, Particle accelerator components, Magnets, Ion beams, Helium, Transport properties.
Identifiers: Ion optics.

A scheme was developed for the variable energy extraction of 25 to 48 MeV protons into a common external beam transport system. The extraction is accomplished by stripping negative hydrogen ions with a thin foil. The magnetic field is held constant while the radius and azimuth of the stripping foil are chosen so that the trajectories for any energy cross at a common point outside the cyclotron vacuum tank. A small combination magnet placed at this crossover point bends the trajectories into a common beam transport system. The first order ion optic matrix representing the fringing field of the cyclotron was calculated at five different energies. An ion optic calculation of the beam transport system is given for two different phase space vectors at the stripper. Comparison is made with the observed operating values. (Author)
AD-655 840 HC$3.00 MF$0.65

20H. Particle Physics

COMMENT ON THE PAPER 'PHOTOELECTRIC ION EMISSION FROM CESIATED SURFACES',
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20C.
AD-655 202 Not available from CFSTI.

FORM FACTORS AT LARGE MOMENTUM TRANSFER,
State Univ of New York Stony Brook
Arthur M. Jaffe. 8 Aug 66, 6p
AFOSR-67-1557
Grant AF-AFOSR-1096-66
Availability: Published in Physical Review Letters v17 n12 p661-2 Sep 19 1966.

Descriptors: (*Nucleons, *Field theory), (*Boundary value problems, *Nuclear energy), Momentum, Theorems, Mass transfer, Stability, Functions, Integral transforms, Mass spectrum, Integrals, Integration, Interactions, Complex variables, Quantum statistics.

The lower bound on form factors at large momentum transfer is derived from the basic principles of local quantum field theory. The fields used are assumed to be covariant, local, having physical energy momentum spectrum but not necessarily tempered.
AD-655 221 Not available from CFSTI.

ANTISYMMETRIZED DISTORTED-WAVE APPROXIMATION FOR NUCLEON-NUCLEUS SCATTERING,
Oregon Univ Eugene
I. E. McCarthy, K. A. Amos, and V. A. Madsen. 23 Sep 66, 29p
AFOSR-67-1600
Grant AF-AFOSR-947-65
Prepared in cooperation with Pittsburgh Univ., Pa. and Oregon State Univ., Corvallis.
Availability: Published in Nuclear Physics vA94 n1 p103-28 1967.

Descriptors: (*Nucleons, Inelastic scattering), (*Nuclei, Inelastic scattering), (*Inelastic scattering, Wave functions), (*Yttrium, *Proton scattering), Matrix algebra, Nuclear shell models, Nuclear cross sections, Approximation (Mathematics), Parity, Momentum, Configuration.
Identifiers: T-matrix.

Inelastic reactions between nucleons and nuclei are discussed using quasi-three-body matrix elements computed in the distorted-wave t-matrix approximation. In this approximation the reaction amplitude is the matrix element of the two-nucleon t-matrix in a distorted-wave representation. Antisymmetry between the nucleons in the entrance and exit channels is taken into account, and a local, spin-dependent model is used for the t-matrix. Single-particle matrix elements are computed as examples. It is shown that space-exchange matrix elements and direct matrix elements are comparable in magnitude and are approximately in phase. Properties of each are discussed in detail. Comparison of the theory with an 89Y (p,p') experiment shows that cross sections of roughly correct magnitude are obtained with no free parameters. (Author)
AD-655 331 Not available from CFSTI.

ELECTRON COMPTON SCATTERING AT THETA = 180 DEGREES,
Stanford Univ Calif High Energy Physics Lab
W. C. Barber, B. Gittelman, W. Selove, D. Thompkins, and F. Forman. Feb 67, 12p Rept no. HEPL-506
Contract Nonr-225 (67)
Prepared in cooperation with Stanford Linear Accelerator Center, Calif., SLAC-Pub-307. Presented at International Conference on Electromagnetic Interactions, Dubna, 6-15 Feb 67.

Descriptors: (*Electrons, Compton scattering), (*Compton scattering, Nuclear cross sections), Bremsstrahlung, Photons, Backscattering, Differential cross section, Fermions, Attenuation, Nuclear spectroscopy.

Previous experiments on high energy elastic pion nucleon scattering have demonstrated the existence of a peak in the differential cross section at 180 degrees. Because the experimental peak is much smaller and narrower than might be anticipated from the perturbation calculation, work was undertaken to explore the possibility that the attenuation of the backward peak is a general property of the Fermion propagator in the crossed channel, not just connected with strong interactions. The approach used involved the measurement of the Compton cross section for bremsstrahlung photons of maximum energy 500 MeV and 950 MeV.
AD-655 451 HC$3.00 MF$0.65

ELASTIC ELECTRON SCATTERING FROM 13C,
Stanford Univ Calif High Energy Physics Lab
Hall Crannell, L. R. Suelzle, F. J. Uhrane, and M. R. Yearian. Jun 67, 10p Rept no. HEPL-508
Contract Nonr-225 (67)
Availability: Published in Physics Letters n.p. n.d.

Descriptors: (*Electrons, Elastic scattering), (*Carbon, Elastic scattering), (*Elastic scattering, Nuclear cross sections), Particle accelerator targets, Methane, Nuclei, Protons, Nuclear energy levels.

Using a target material consisting of methane, enriched to 58% in 13C, a study was made of elastic electron scattering of 250 MeV energy incident electrons at a variety of angles. The absolute target density was determined by electron scattering from the nuclei of hydrogen contained in the methane, and by comparing the measured cross sections with known proton cross sections. The contribution to the elastic scattering due to the 12C in the target material was subtracted by a calculation which uses previously measured 12C cross sections. The data are analyzed using an harmonic oscillator model and the ratio rms radius of the charge distribution for 13C to that of 12C is found to be 0.96 +0.01 or -0.01. (Author)
AD-655 453 Not available from CFSTI.

POSITRON LIFETIMES IN METALS,
Brandeis Univ Waltham Mass
Howard Weisberg, and Stephan Berko. 9 Aug 66, 13p
AROD-3389:12
Grant DA-ARO (D)-31-G877
Availability: Published in The Physical Review v154 p249-57 Feb 10 1967.

Descriptors: (*Positrons, Annihilation reactions), (*Annihilation reactions, Metals), Band theory of solids, Sodium, Beta decay, Electrons, Magnesium, Crystal lattices.

Positron decay curves in various metals were measured, using careful sample preparation techniques and a delayed-coincidence system with 0.30-nsec (full width at half-maximum) prompt time resolution and 10,000:1 peak-to-background ratio. Evidence was found that the annihilation in pure metals under ideal conditions is characterized by a single exponential decay, the second lifetime usually observed being an artifact of sample preparation. In the case of Mg with Na22 produced in situ by the (p, alpha) reaction, a single

exponential decay over approximately four decades was observed. In a plot of annihilation rate versus conduction electron density, the observed rates for the nearly-free-electron metals fell close to the theoretical curve of Kahana, approaching the spin-averaged positronium rate at low densities. Compared with these rates, annihilation rates at a given valence-electron density were found to be higher in the transition metals and lower in Be, Bi, and in the semiconductors Si and Ge, in agreement with qualitative ideas about the one-positron many-electron system in real metals. Within the experimental error, no difference in lifetime was observed between intrinsic and heavily n-type Si, and similarly for Ge. (Author)
AD-655 478 Not available from CFSTI.

INSTABILITIES IN HIGHLY EVOLVED STELLAR MODELS.
California Inst of Tech Pasadena
For primary bibliographic entry see Field 3B.
AD-655 493 Not available from CFSTI.

PREDICTED EMISSION SPECTRA OF QUASI-STELLAR SOURCES IN THE FAR ULTRAVIOLET.
California Inst of Tech Pasadena
For primary bibliographic entry see Field 3B.
AD-655 498 Not available from CFSTI.

STRUCTURE OF 7Be (II). THE 6Li (p,p")6Li AND 4He (3He,p")6Li* REACTIONS,**
California Inst of Tech Pasadena
William D. Harrison. 12 Sep 66, 14p
Contract Nonr-220 (47)
See also AD-655 501.
Availability: Published in Nuclear Physics v92 n2 p260-72 1967.

Descriptors: (* Beryllium, * Nuclear structure), (* Helium, * Ion bombardment), (* Lithium, * Proton reactions), Nuclear cross sections, Differential cross section, Nuclear energy levels, Excitation, Nuclear spins, Nuclear scattering.

The total and the differential cross sections for the 6Li (p,p")6Li** (3.562 MeV) reaction were measured over a range of incident proton lab energies between 4.26 and 9.40 MeV. The total cross section for the 4He (3He,p")6Li** reaction was measured over a range of incident 3He lab energies between 13.81 and 18.45 MeV. The analysis indicates the presence of two interfering states, both with J (pi) = 3/2 (-), located at about 10.0 and 11.0 MeV excitation energy in 7Be. The widths are 1.8 and 0.4 MeV, and isospins are T = 1/2 and T = 3/2, respectively. Values for the reduced widths of the isospin allowed channels of the T = 3/2 state have been extracted, and the Thomas-Ehrman shift with respect to the corresponding 7Li state estimated. The existence of an extremely broad J (pi) = 1/2 (-) state at roughly 10 MeV or greater 7Be excitation energy is suggested. Measurements were made to determine the correct normalization of several sets of data on eight 7Be-forming reactions. (Author)
AD-655 500 Not available from CFSTI.

STRUCTURE OF 7Be (I). THE 6Li (p,p')6Li* REACTION,
California Inst of Tech Pasadena
William D. Harrison. 12 Sep 66, 8p
Contract Nonr-220 (47)
Availability: Published in Nuclear Physics v92 n2 p253-9 1967.

Descriptors: (* Beryllium, * Nuclear structure), (* Lithium, * Proton bombardment), Nuclear energy levels, Excitation, Nuclear spins, Nuclear scattering.

The differential cross section for the 6Li (p,p')6Li* (2.184 MeV) reaction was measured over a range of incident proton lab energies between 3.60 and 9.40 MeV. The analysis of a broad resonance indicates the presence of a 1.8 MeV broad state in 7Be at about 10.0 MeV excitation energy with the properties J (pi) = 3/2 (-) or 5/2 (-), with 7/2 (-) or 9/2 (-) being possible but less probable, and T = 1/2. (Author)
AD-655 501 Not available from CFSTI.

SATURATION PROBLEM OF A SUM RULE OF SCALAR AND PSEUDOSCALAR SPECTRAL FUNCTIONS.
Maryland Univ College Park Dept of Physics and Astronomy
For primary bibliographic entry see Field 20J.
AD-655 516 HC$3.00 MF$0.65

PARTICLE-HOLE STATES IN THE ALPHA PARTICLE WITH REALISTIC FORCES,
Stanford Univ Calif Dept of Physics
B. R. Barrett. 6 Jun 66, 17p
AFOSR-67-1622
Contract AF 49 (638)-1389
Availability: Published in Physical Review v154 n4 p955-70 Feb 20 1967.

Descriptors: (* Alpha particles, * Nuclear energy levels), Nuclear forces, Excitation, Interactions, Nuclear shell models, Wave functions, Meson capture, Hartree-Fock approximation.

The Tamm-Dancoff equations are solved, using the realistic separable potential of Tabakin, for the odd-parity excited states of 4He. A comparison is made with results obtained using the hard-core potentials of Brueckner, Gammel, and Thaler and of Hamada. The calculated spectrum is found to be strongly influenced by the p-state contributions, particularly by the effect of the tensor interaction. It is predicted that the O (-), T=O state lies close to the pi (-), T=O state. The spin-orbit splitting between the p1/2 and p3/2 single-particle states is calculated and found in first order to depend only on the relative two-body spin-orbit interaction. The estimate for the ratio of the probability of an El transition from the upper 1 (-), T-1 state to the ground state to that of an El transition from the Lower 1 (-), T=1 state is calculated to be 1.6, compared with the experimental ratio which is approx. 1/2. The squared matrix elements and the total capture rate for muon capture in 4He are also calculated. The squared matrix elements are found to be equal within 10 percent, but the calculated total capture rate is smaller than the experimental rate. The theoretical results tend to justify the use of the supermultiplet theory for the excited states of the alpha particle. It is found that the seven equations for the energy splittings depend upon only four quantities. Consequently, it is possible to obtain three relations, which give the two unobserved energy splittings and the ratio of the El transition probabilities in terms of the four observed energy splittings. The two empirical results which can be compared with experiment are in excellent agreement. (Author)
AD-655 523 Not available from CFSTI.

NEUTRON ENERGY SPECTRUM - A CLASSICAL DERIVATION,
Naval Radiological Defense Lab San Francisco Calif
David Hoffman. 31 Jul 67, 48p Rept no.
USNRDL-TR-67-57

Descriptors: (* Neutron spectrum, Statistical analysis), Neutron scattering, Neutron absorption, Probability, Neutron cross sections, Equations.

The epithermal neutron energy spectrum is derived as a function of radial distance from a point isotropic monoenergetic neutron emitter in an infinite homogeneous scattering and absorbing medium. The derivation uses Condon and Breit's neutron energy spectrum as a function of number of collisions and Chandrasekhar's general solution to the problem of random flights. (Author)
AD-655 625 HC$3.00 MF$0.65

SIDEWISE DISPERSION RELATIONS AND THE AXIAL-VECTOR COUPLING CONSTANT,
California Univ Berkeley Coll of Engineering
For primary bibliographic entry see Field 20J.
AD-655 726 Not available from CFSTI.

INVERSE COMPTON RADIATION IN QUASI-STELLAR OBJECTS,
Columbia Univ New York Dept of Astronomy
For primary bibliographic entry see Field 3B.
AD-655 729 Not available from CFSTI.

FEYNMAN DIAGRAMS FOR UNITARY REPRESENTATIONS OF SL (2,C),
Imperial Coll of Science and Technology London (England)
For primary bibliographic entry see Field 20J.
AD-655 733 HC$3.00 MF$0.65

FUBINI SUM RULES FOR VERTEX FUNCTIONS.
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
For primary bibliographic entry see Field 20J.
AD-655 737 HC$3.00 MF$0.65

A HOMOLOGICAL APPROACH TO PARAMETRIC FEYNMAN INTEGRALS,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
For primary bibliographic entry see Field 12A.
AD-655 738 HC$3.00 MF$0.65

CONSISTENCY CONDITIONS ON MODELS FOR HIGH-ENERGY SCATTERING,
Cambridge Univ (England) Cavendish Lab
For primary bibliographic entry see Field 20J.
AD-655 739 Not available from CFSTI.

VECTOR AND SPINOR CURRENT ALGEBRA AND THE N/D METHOD,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
For primary bibliographic entry see Field 20J.
AD-655 745 HC$3.00 MF$0.65

ELASTIC SCATTERING OF LOW-ENERGY ELECTRONS FROM MOLECULAR HYDROGEN,
Aerospace Corp El Segundo Calif Labs Div
For primary bibliographic entry see Field 7D.
AD-655 785 HC$3.00 MF$0.65

INVESTIGATION OF EXTRA-NUCLEAR EFFECTS IN ANGULAR CORRELATIONS.
Final scientific rept., 1 Feb 65-1 Jun 67,
Bonn Univ (West Germany) Institut Fuer Strahlen-Und Kernphysik
E. Bodenstedt. 1 Jun 67, 5p
AFOSR-67-1612
Grant AF-EOAR-59-65

Descriptors: (* Nuclear magnetic moments, Nuclear energy levels), Nuclear shell models, Electrostatic fields, Magnetic fields, Interactions, West Germany.

The document is comprised of a very brief summary of the work accomplished (dealing largely with magnetic moments of excited nuclei), and a list of the three published papers resulting therefrom.
AD-655 801 HC$3.00 MF$0.65

PU241 CROSS-SECTIONS BELOW 1 KE V.
Atomic Energy Establishment, Winfrith (England). General Reactor Physics Div.
G. Doherty. 1967, 18p AEEW-M-714

Descriptors: * Neutron cross section, * Plutonium 241, Cross, Data, Energy, File, Library, Measurement, Neutron, Nuclear, Physics, Range, Reaction, Section, Technique.

For abstract, see STAR 05 17.
N67-30300 HC$3.00 MF$0.65

THE GROUND-STATE THREE-BODY CORRELATION FUNCTION IN A DILUTE BOSON GAS WITH HARD- SPHERE INTERACTION.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
P. Bocchieri, C. A. Orzalesi, and V. H. Smith, Jr.. 1 Feb 67, 24p
Contract AF 61/052/-874
Its Preprint No. 181

Descriptors: * Boson field, * Correlation function, * Ground state, * Quantum mechanics, * Three-body problem, Boson, Calculation, Correlation, Field, Function, Gas, Ground, Hardness, Interaction, Mechanics, Quantum, Sphere, State, System, Wave.

For abstract, see STAR 05 17.
N67-30391 HC$3.00 MF$0.65

APPROXIMATION BY A SINGLE SLATER DETERMINANT.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
W. Kutzelnigg, and V. H. Smith, Jr.. 1 Mar 67, 16p
Contract AF 61/052/-874
Its Preprint No. 184

Descriptors: * Approximation method, * Particle theory, * Quantum mechanics, * Spin-orbit interaction, Antisymmetry, Approximation, Fermion, Field, Function, Interaction, Mechanics, Method, Model, Orbit, Particle, Quantum, Slater orbital, Spin, State, System, Theory, Wave.

For abstract, see STAR 05 17.
N67-30395 HC$3.00 MF$0.65

COLLISION PROBABILITIES FOR FINITE CYLINDERS AND CUBOIDS.
Aktiebolaget Atomenergi, Stockholm (Sweden).
I. Carlvik. May 67, 30p AE-281

Descriptors: * Collision, * Cube, * Cylinder, * Fortran, * Probability theory, Calculation, Code, Computer, Distribution, Escape, Formula, Homogeneity, Monte carlo method, Nuclear, Parallelepiped, Probability, Program, Theory.

For abstract, see STAR 05 17.
N67-30507 HC$3.00 MF$0.65

POLARIZED ELASTIC FAST-NEUTRON SCATTERING OFF 12 C IN THE LOWER ME V-RANGE. I - EXPERIMENTAL PART.
Aktiebolaget Atomenergi, Stockholm (Sweden).
D. Aspelund. May 67, 52p AE-282

Descriptors: * Carbon 12, * Elastic scattering, * Fast neutron, * Neutron scattering, * Polarization, Analysis, Angular, Cross section, Distribution, Elastic, Fast, Low energy, Neutron, Phase, Scattering, Shift, Theory.

For abstract, see STAR 05 17.
N67-30520 HC$3.00 MF$0.65

SCATTERING OF ALPHA PARTICLES BY MEDIUM-WEIGHT NUCLEI.
Japan Atomic Energy Research Inst., Tokyo.
M. Inoue, I. Kumabe, H. Ogata, Y. Okuma, and S. Tomita. Oct 66, 11p NSJ-TR-64
Transl. Into English From Genshikaku Kenkyu (Japan), V. 9, No. 6, Mar. 1965 P 726-731

Descriptors: * Alpha radiation, * Angular distribution, * Elastic scattering, Alpha, Analyzer, Angular, Detector, Distribution, Elastic, Inelasticity, Isotope, Magnetic, Nickel, Nucleus, Phonon, Radiation, Scattering, Tin, Zirconium.

For abstract, see STAR 05 17.
N67-30665 HC$3.00 MF$0.65

RESEARCH ON NUCLEAR PHOTOACTIVATION BY X-RAYS.
Etude Sur La Photoactivation Nucleaire Par Rayons X
Paris Univ., Orsay (France). Laboratoire de Chimie Physique.
M. Boivin, Y. Cauchois, and Y. Heno. Apr 67, 35p EUR-3298.F
Contract EURATOM-059-64-12 RISF
in French, English Summary

Descriptors: * Neutron activation, * Radiant energy, * X-ray, Activation, Concentration, Cross section, Energy, Intensity, Neutron, Nuclear, Radiance, Spectroscopy, Tube, Voltage.

For abstract, see STAR 05 17.
N67-30749 HC$3.00 MF$0.65

COHERENT PRODUCTION OF PARTICLES IN COLLISIONS OF 200 GE V PIONS WITH EMULSION NUCLEI.
Polish Academy of Sciences, Warsaw. Inst. of Nuclear Research.
Z. Czachowska, J. Gierula, S. Krzywdzinski, M. Miesowicz, and K. Rybicki. 1967, 12p REPT.-774/VI/PH

Descriptors: * High energy interaction, * Particle production, * Photographic emulsion, * Pion, * Spectrometric tracking, Angle, Atom, Coherent, Collimation, Collision, Cross, Diffraction, Dissociation, Distribution, Emission, Emulsion, Energy, Evaporation, High energy, Interaction, Nuclear, Nucleus, Particle, Photographic, Production, Scanning, Secondary, Section, Spectrometry, Tracking.

For abstract, see STAR 05 17.
N67-31100 HC$3.00 MF$0.65

POLARIZATION PHENOMENA IN NUCLEAR STRUCTURE.
Polish Academy of Sciences, Cracow. Inst. of Nuclear Research.
Z. Bochnacki. Mar 67, 43p INP-536/PL
in Polish, English Summary

Descriptors: * Atomic structure, * Nuclear interaction, * Polarization, Atom, Effect, Interaction, Nuclear, Physics, Polishing, Residual, Structure.

For abstract, see STAR 05 17.
N67-31133 HC$3.00 MF$0.65

THE FISSION OF 197 AU BY 13.4 ME V DEUTRONS.
Polish Academy of Sciences, Warsaw. Inst. of Nuclear Research.
P. Decowski, and L. Natanson. 1967, 7p REPT.-772/I/IA/PL

Descriptors: * Deuteron, * Fission product, * Gold, * Isotope, * Scattering cross section, * Spectrometric tracking, Barrier, Contamination, Cross, Cyclotron, Detection, Fission, Foil, Fragment, Measurement, Neutron, Product, Scattering, Section, Spectrometry, Tracking.

For abstract, see STAR 05 17.
N67-31134 HC$3.00 MF$0.65

THE LATITUDE - LOCAL TIME DEPENDENCE OF LOW ENERGY COSMIC RAY CUT-OFFS IN A REALISTIC GEOMAGNETIC FIELD.
State Univ. of Iowa, Iowa City. Dept. of Physics and Astronomy.
H. E. Taylor. May 67, 19p NASA-CR-85600
Grant NSG-233-62

Descriptors: * Cosmic ray, * Cut-off, * Geomagnetic field, * Time dependency, Cosmic, Dependency, Equation, Field, Geomagnetic, Latitude, Magnetic, Magnetosphere, Motion, Particle, Ray, Solar, Time, Trajectory, Wind.

For abstract, see STAR 05 17.
N67-31201 HC$3.00 MF$0.65

THE COMPOSITION OF GALACTIC COSMIC RAYS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
C. E. Fichtel, and D. V. Reames. Jul 67, 12p
NASA-TM-X-55835, X-611-67-325

Descriptors: * Cosmic ray, * Galaxy, * Sounding rocket, Astrophysics, Composition, Cosmic, Fragmentation, Light, Low energy, Measurement, Nucleon, Particle, Ratio, Ray, Rocket, Satellite, Sounding.

For abstract, see STAR 05 17.
N67-31208 HC$3.00 MF$0.65

THE PRIMARY COSMIC RAY ELECTRON SPECTRUM IN THE ENERGY RANGE FROM 300 ME V TO 4 BE V FROM 1964 TO 1966.
Chicago Univ., Ill. Enrico Fermi Inst. for Nuclear Studies.
J. Lheureux, and P. Meyer. Jun 67, 11p NASA-CR-85788, EFINS-67-52
Grant NSG-144-61, Contract NSF GP-4709

Descriptors: * Cosmic ray, * Electron spectrum, * Energy level, Accuracy, Balloon, Cosmic, Electron, Energy, Flux, Intensity, Level, Ray, Spectrum, Telescope.

For abstract, see STAR 05 17.
N67-31227 HC$3.00 MF$0.65

STATISTICAL METHOD OF NEUTRON TRANSPORT IN ABSORBING MEDIA.
Atomic Energy Centre, Dacca (Pakistan).
M. Ahsan. Jun 66, 9p AECD-EP-13

Descriptors: * Energy spectrum, * Neutron spectrum, * Statistical analysis, Absorption, Analysis, Energy, Function, Medium, Model, Monoenergetic, Neutron, Source, Space, Spectrum, Statistical.

For abstract, see STAR 05 17.
N67-31385 HC$3.00 MF$0.65

TERNARY FISSION OF 236/92 U.
Polish Academy of Sciences, Cracow. Inst. on Nuclear Physics.
J. Benisz, and T. Panek. 1967, 24p INP-529/PL

Descriptors: * Fission product, * Heavy nucleus, * Nucleus, * Particle emission, * Ternary system, * Uranium, Binary, Cross, Distribution, Emission, Energy, Fission, Heavy, Isotope, Kinematics, Kinetic, Mass, Measurement, Particle, Partition, Plate, Product, Section, Spectroscopy, Symmetry, System, Ternary, Yield.

For abstract, see STAR 05 17.
N67-31402 HC$3.00 MF$0.65

20I. Plasma Physics

DETERMINATION OF ELECTRON DENSITY USING THE MICROWAVE CAVITY TECHNIQUE,

Group 201—Plasma physics

Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
A. R. McKinney.Sep 61, 30p AFCRL-765

Descriptors: (* Plasma medium, Analysis), (* Cavity resonators, Plasma medium), Electron density, Excitation, Microwave frequency, Gas ionization, Gas discharges, Electromagnetic pulses, Pulse generators, Circuits, Oscilloscopes.
Identifiers: Plasma diagnostics.

The microwave cavity method of plasma diagnostics is discussed. The study includes theoretical background, as well as the development of a simple relationship of resonant frequency shift to electron density. Mathematical treatment of an actual experiment is given, with results (in good agreement with previous measurements) presented for the afterglow decay of electron density in a neon plasma. There are several innovations in electronic circuitry described, including (1) techniques for the production of ionization pulses of a more precisely controlled nature than previously employed and (2) a graphic readout of cavity resonance shift on a cathode ray oscilloscope. (Author)
AD-271 880 HC$3.00

RATES OF IONIZATION AND RECOMBINATION PROCESSES IN HEATED AIR.
Picatinny Arsenal, Dover, N. J. Feltman Research Labs.
For primary bibliographic entry see Field 7D.
AD-444 343 HC$3.00

PROPERTIES OF COPPER PLASMA. CALCULATION OF THE PARTITION FUNCTION, SPECIES CONCENTRATION, AND SPECTRAL-LINE INTENSITIES,
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
Stuart W. Bowen. Jul 64, 142p Rept. no. 4613-66-T
Contract SD-91, ARPA Order-236

Descriptors: (* Plasma medium, * Copper), Ionization potentials, Pressures, Vapors, Ionization, Temperature, Line spectrum, Intensity, Atomic energy levels.

The self-consistent partition, ionization potential lowering, electron, ion, and neutral particle species concentrations, and the absolute spectral-line intensities of Cu I Lambda 5106 and Cu I Lambda 5153 are reviewed and tabulated for pressures between 0.03 and 10 atm, for original mole fractions between 10-4 and 0.03 and for temperatures from 2000 to 10,000 K, for copper vapor in a hot inert gas at thermal equilibrium. Only single ionization of copper is considered in this range of conditions. For the partition function cutoff, all electron states whose classical semi-major axis exceeds one-half the Debye distance are suppressed. The results should be of use in spectroscopic plasma diagnostics and other situations where the trace amounts of copper usually present can be for temperature measurement. (Author)
AD-444 386 HC$3.00

CURRENT DIFFUSION IN A SHOCK TUBE WITH VARYING MAGNETIC FIELD,
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
Michiru Yasuhara. 15 Nov 66, 6p
Research supported in part by AFOSR.
Availability: Published in Journal of the Physical Society of Japan v22 n3 p901-5 Mar 1967.

Descriptors: (* Magnetohydrodynamics, Shock tubes), Electric currents, Magnetic fields, Diffusion, Numerical analysis, Temperature, Velocity, Density, Pressure.

The electric current-diffusion layer near the current sheet in a magnetic shock tube is analysed by extending Falk and Turcotte's method to the case in which the driving magnetic field varies with time. Some numerical results for the temperature, velocity, density, pressure and magnetic field are presented in terms of similarity variable when the driving magnetic field varies as a power of time. The results show that the back end of the flowing gas is displaced from its infinite conductivity position by introducing the thermal and electrical conductivities, and the temperature at the back end of the gas becomes finite, the value of which depends on the ratio of thermal to electrical diffusion parameter. (Author)
AD-655 190 Not available from CFSTI.

GAS IONIZING SHOCK WAVE IN MAGNETIC SHOCK TUBE,
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
Michiru Yasuhara. 8 Nov 66, 9p
Research supported in part by AFOSR.
Availability: Published in Transactions of the Japan Society for Aeronautical and Space Sciences v9 n15 p70-6 1966.

Descriptors: (*Gas ionization, *Shock waves), (*Magnetohydrodynamics, Shock waves), Shock tubes, Electrical conductance, Magnetic fields, Temperature, Equations, Wake.

The gas ionizing shock wave, in which the gas in front of the shock wave has an electrical conductivity of zero and the one behind it has an infinite conductivity, is treated introducing a modelized ionization temperature by applying CHU's theory. It is deduced that if the ionizing temperature is sufficiently smaller than the temperature in front of the shock wave times the square of the shock Mach number, the shock condition is very close to the MHD shock condition. Also this analysis is applied to the problem of the flow in a magnetic annular shock tube. (Author)
AD-655 191 Not available from CFSTI.

PROCURSOR STUDIES IN AN ELECTROMAGNETICALLY DRIVEN SHOCK TUBE.
Revised ed.,
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
M. J. Lubin, and E. L. Resler, Jr. 12 Sep 66, 8p
Revision of manuscript submitted 27 Jun 66. Research supported in part by Nonr.
Availability: Published in The Physics of Fluids v10 n1 8p Jan 1967.

Descriptors: (*Gas ionization, *Shock waves), (*Magnetohydrodynamics, Shock waves), Shock tubes, Reynolds number, Propagation, Electric fields, Electron density, Plasma medium.

Precursor waves was studied in an electromagnetic shock tube of the T configuration. The precursor velocity, electron density, and current content were determined over a pressure range of 1 to 1000 microns Hg, for electrode discharge voltages of 3 to 17 kV in hydrogen and argon. A longitudinal nanosecond microwave technique was used in conjunction with a semi-infinite microwave cavity measurement to measure the precursor velocity and attendant detailed electron density structure. The current associated with the precursor was deduced from transverse magnetic field measurements made with an external pickup coil. The precursor exhibits a definite wave structure with front thicknesses of the order of 2 to 5 cm. (Author)
AD-655 192 Not available from CFSTI.

ION DENSITY PROFILES BEHIND SHOCK WAVES IN AIR.
Revised ed.,
Cornell Univ Ithaca N Y
A. Frohn, and P. C. T. de Boer. 26 Sep 66, 4p
Revision of manuscript submitted 18 Jul 66. Prepared for presentation at the AIAA Aerospace Sciences Meeting (5th), New York, January 23-26 1967, Paper 67-94. Research supported in part by Nonr.
Availability: Published in AIAA Journal v5 n2 p261-4 Feb 1967.

Descriptors: (*Gas ionization, Shock waves), (*Electron density, Plasma medium), Air, Hypersonic flow, Shock tubes, Probes, Wake, Space charges, Nitrogen oxides, Ions, Relaxation time.

Experimental results are reported for the ionization rate behind shock waves of Mach numbers between 7.2 and 9.2. The results were obtained using a hollow, total collector probe in combination with a 38-mm-diam, stainless steel shock tube designed to minimize the impurity level in the test gas. Good agreement was obtained with a theoretical result based on Lin and Teare's rate equations. Equilibrium ion densities in good agreement with theory were measured behind shocks of Mach number 7.2-12.8, with initial pressures between 0.5 and 40-mm Hg. The effects on the measurements of deviations from ideal shock tube flow were determined to be small. Ion densities measured range from 10 to the 8th power to 10 to the 12th power/cc. At the higher ion densities there are large space charge effects inside the probe. Under these circumstances, proper operation of the probe still could be obtained provided the collector potential was not made too high. This implies that the mobility of the NO ions collected must be rather large. (Author)
AD-655 194 Not available from CFSTI.

GENERATION OF VORTICITY BY WAVES IN A PLASMA,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
James A. Ross, and Uno Ingard. 16 Jan 67, 2p
Contract Nonr-1841 (42)
Availability: Published in The Physics of Fluids v10 n4 p899-900 Apr 1967.

Descriptors: (*Plasma medium, Interactions), (*Magnetic fields, *Plasma physics), Gases, Acceleration, Density, Velocity, Viscosity, Sound, Perturbation theory, Numerical analysis.

The analysis of the generation of vorticity by waves in a neutral gas is extended to the case of a plasma. It is shown that waves can interact with a plasma in a uniform magnetic field to generate vorticity.
AD-655 208 Not available from CFSTI.

QUESTIONS OF MAGNETOHYDRODYNAMICS III: SELECTED ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
G. A. Popov, V. B. Tikhonov, and D. A. Munshtukov. 11 May 67, 28p Rept no. FTD-MT-65-293
TT-67-62353
Voprosy Magnitnoi Gidrodinamiki; III, Edited machine trans. of Soveshchanie po Teoret. i Prikladnoi Magnitoi Gidrodinamike (no. 3), Riga, 1962. Doklady Soveshchaniya Riga, 1963 p5-8, 395-405.

Descriptors: (*Magnetohydrodynamics, Mathematical analysis), (*Magnetohydrodynamic generators, Thermodynamics), Entropy, Reynolds number, One-dimensional flow, Gas flow, USSR.

Contents: Approximate calculation of a conductive MHD-generator with use of the concept of entropy; Concerning a different approach to determination of magnetic reynolds number and boundedness of the one-dimensional approximation with respect to Re sub m during flow of a conducting gas.
AD-655 362 HC$3.00 MF$0.65

VARIABLE CONDUCTIVITY FULLY DEVELOPED MHD CHANNEL FLOW,

Aerospace Research Labs Wright-Patterson AFB Ohio
Paul C. Kieffer. Mar 67, 75p Rept no. ARL-67-0046
Master's thesis prepared at Air Force Inst. of Tech., Wright-Patterson AFB, Ohio, Dept. of Mechanical Engineering.

Descriptors: (*Magnetohydrodynamics, *Electrical conductance), Velocity, Volume, Shear stresses, Boundary layer, Differential equations.

Fully developed MHD channel flow was studied for several conductivity profiles to determine the effect of non-uniform electrical conductivity on the flow variables. The velocity profiles, volume rate of flow, and shear at the wall were investigated. If the conductivity only varies near the wall, the flow is moderately affected. If the conductivity in the central portion of the channel varies, significant changes (as much as 300% error based on uniform conductivity results) can occur. Variable conductivity has its greatest effect when the conductivity increases from the centerline to the walls. Inflection points can occur in the velocity profiles when the conductivity decreases from the centerline to the walls. (Author)
AD-655 369 HC$3.00 MF$0.65

ANOMALOUS PLASMA TRANSPORT IN RF DISCHARGES,
Texas Univ Austin Dept of Electrical Engineering
E. J. Powers, and P. B. Mumola. 1967, 8p
AFOSR-67-1595
Grant AF-AFOSR-766-67
Availability: Published in 1967 SWIEEECO Record nF-72 p2-4-1-6 Apr 19 1967.

Descriptors: (*Plasma physics, Radio waves), Transport properties, Magnetic fields, Helium, Ions, Stability, Noise, Argon.

The growth criterion for an ion-acoustic instability predicts a critical magnetic field dependence on pressure p, tube radius R, and ion mass m sub i, which is in good agreement with the experimental observations in the low pressure radio frequency discharge. (Author)
AD-655 381 Not available from CFSTI.

MAGNETIC FIELDS AND SMALL-SCALE STRUCTURE OF THE SOLAR ATMOSPHERE,
Harvard Coll Observatory Cambridge Mass Solar Dept
For primary bibliographic entry see Field 3B.
AD-655 400 Not available from CFSTI.

STIMULATED EMISSION FROM THE UPPER HYBRID RESONANCE IN A MAGNETOPLASMA.
Technical rept.,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
R. M. Hill, D. E. Kaplan, and S. K. Ichiki. 15 Jun 67, 9p Rept no. TR-11
Contracts Nonr-2451 (00), AF 19 (628)-5932

Descriptors: (*Plasma medium, Emissivity), (*Coherent radiation, Plasma medium), Cyclotron resonance phenomena, Frequency, Electron density, Argon, Afterglows, Microwaves.
Identifiers: Plasma diagnostics.

The report describes the first observations of coherent emission from the upper hybrid resonance of a magnetoplasma, and the measurement of the frequency of this resonance as a function of electron density. The technique reported constitutes a new and useful means for the study of collective phenomena in magnetoplasmas and may also serve as an accurate means for the direct measurement of electron density in such plasmas. (Author)
AD-655 450 HC$3.00 MF$0.65

ENERGETIC IONS FROM N2 PRODUCED BY ELECTRON IMPACT,
Joint Inst for Lab Astrophysics Boulder Colo
For primary bibliographic entry see Field 7D.
AD-655 477 Not available from CFSTI.

EFFECT OF NONZERO Pr sub m ON HYDROMAGNETIC AIRFOIL THEORY,
Cornell Univ Ithaca N Y
For primary bibliographic entry see Field 20D.
AD-655 550 Not available from CFSTI.

KINETIC EQUATIONS FOR PLASMAS.
Research rept.,
Polytechnic Inst of Brooklyn N Y Dept of Aerospace Engineering and Applied Mechanics
Toyoki Koga. Apr 67, 82p
PIBAL-1007
Contract Nonr-839 (38), ARPA Order-529

Descriptors: (*Plasma medium, Kinetic theory), Equations of motion, Charged particles, Interactions, Probability.
Identifiers: Defender project.

Because of the time scale assumption necessary for its derivation, the Bogoliubov-Born-Green-Kirkwood-Yvon (BBGKY) hierarchy of equations is not applicable to systems consisting of charged particles, except for special subsystems. A new class of equations governing the evolutions of charged particles is derived from the Liouville equation and is coarsed-grained with respect to time and similar particles. In the zeroth approximation, there are two basic types of inter-particle interactions: One is of the Vlasov type and the other of the Boltzmann type characterizing interactions among nearest neighboring particles. In higher order approximations, mutual perturbations among those basic interactions result in secondary effects; for example, two nearest-neighboring particles exert a force of microscopic order to another particle. Depending on the ratio between the number of electrons and the number of ions in a real system, the simulating model varies. The main purpose of the paper is to present schemes of rational treatment, rather than to provide numerical results in detail for a particular system. (Author)
AD-655 615 HC$3.00 MF$0.65

GENERALIZED MAGNETO-IONIC THEORY FOR STRONG ELECTRIC FIELDS,
Brandeis Univ Waltham Mass Dept of Physics
Pradip M. Bakshi. Jun 67, 24p Rept no. Scientific-3
AFCRL-67-0397
Contract AF 19 (628)-4019

Descriptors: (*Magnetohydrodynamics, Theory), Electric fields, Distribution functions, Conductivity, Transport properties, Ionosphere, Electrons.

The generalized magneto-ionic theory (Sen and Wyller, 1960) with velocity dependent electron-neutral collisions is considered here for strong electric fields which significantly alter the isotropic part of the electron distribution function. Explicit expressions are developed for the distribution function and the non-linear conductivity for the special case of practical interest where the collision frequency is proportional to the energy. Some of the implications and possible applications for ionospheric problems are outlined in the last section. (Author)
AD-655 788 HC$3.00 MF$0.65

NOZZLE FLOW OF A CHEMICALLY REACTING AND RADIATING IONIZED GAS.
Technical rept.,
Massachusetts Inst of Tech Cambridge Aerophysics Lab
Robert C. Sepucha. Jun 67, 106p Rept no. TR-141
AFOSR-67-1397
Contract AF 49 (638)-1621

Descriptors: (*Nozzle gas flow, *Magnetohydrodynamics), Supersonic flow, Chemical reactions, Nonequilibrium flow, Argon, Thermal radiation, Gas ionization, Optical properties, Mathematical models.

A theoretical investigation is presented of the flow of a radiating ionized gas through a supersonic expansion nozzle. The gas model employed is that of singly ionizable argon possessing a nonequilibrium concentration level and a nonequilibrium energy distribution. A consistent mathematical description is devised which includes the effects of a multistep collisional ionization process as well as those of bound-bound and bound-free radiative transitions. Emphasis is placed on the contributions of the nonequilibrium radiation field in the general case as well as the optically thick and thin limits. An explicit form of the critical speed of a two temperature gas is also presented. (Author)
AD-655 836 HC$3.00 MF$0.65

ABOUT THE CALCULATION OF A DISCHARGE COIL WITH GIVEN DISTRIBUTION OF THE INDUCED ELECTRIC FIELD.
Ueber Die Berechnung Einer Entladungsspule Mit Vorgege-bener Verteilung des Induzierten Elektrischen Feldes
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Stuttgart (West Germany). Inst. Fuer Energiewandlung Und Elektrische Antriebe.
W. Preschka, and B. Tries. Apr 67, 19p DLR-FB-67-28
in German, English Summary

Descriptors: *Coil, *Plasma discharge, Configuration, Confinement, Density, Discharge, Distribution, Electric, Energy, Field, Frequency, Magnetic, Numerical, Plasma, Radio, Solution, Transfer.

For abstract, see STAR 05 17.
N67-30473 HC$3.00 MF$0.65

NON-LINEAR GENERATION OF HARMONICS IN A LOSSY PLASMA.
Royal Inst. of Tech., Stockholm (Sweden). Microwave Dept.
A. Sjoelund. Jan 67, 13p RADC-TR-67-276, SR-15
Contract AF 61/052/-895

Descriptors: *Coupled mode, *Plasma, *Secondary harmonic generation, *Wave propagation, Attenuation, Coefficient, Constant, Coupled, Coupling, Damping, Equation, Frequency, Generation, Harmonic, Method, Mode, Nonlinear, Numerical, Oscillation, Propagation, Secondary, Wave.

For abstract, see STAR 05 17.
N67-30516 HC$3.00 MF$0.65

NON-IDEAL MGD FLOWS IN BOUNDARY LAYER APPROXIMATION.
Innsbruck Univ. (Austria). Inst. for Theoretical Physics.
H. Friedel. 5 Mar 67, 25p SR-42, AFOSR-67-0992
Contract F61052-67-C-0014

Descriptors: *Boundary layer flow, *Magnetogasdynamics, *Nozzle flow, Approximation, Boundary, Differential, Dimensional, Equation, Flow, Gas, Jet, Layer, Method, Nozzle, Plasma, Two.

For abstract, see STAR 05 17.
N67-30657 HC$3.00 MF$0.65

USE OF A MONOCHROMATOR FOR THE VELOCITY AND TEMPERATURE MEASUREMENTS IN A COAXIAL PLASMA ACCELERATOR.

Group 20I—Plasma physics

Polish Academy of Sciences, Warsaw.
S. Kulinski, J. Nowikowski, and S. Suckewer.
1967, 25p INR-781/XVIII/PP

Descriptors: *Electron temperature, *Hydrogen ion, *Monochromator, *Plasma gun, *Velocity measurement, Air, Coaxial, Delay, Electron, Energy, Gas, Gun, Hydrogen, Ion, Mass, Measurement, Plasma, Temperature, Time, Velocity.

For abstract, see STAR 05 17.
N67-30706 HC$3.00 MF$0.65

INVESTIGATION OF THE HIGHLY IONIZED ARGON ELECTRIC ARC PLASMA WITH ROTARY LANGMUIR SONDES AT ATMOSPHERIC PRESSURE.
Untersuchung des Hochionisierten Argon- Lichtbogenplasmas Mit Rotierenden Langmuir- Sonden Bei Atmosphaerendruck
Eidgenossische Technische Hochschule, Zurich (Switzerland).
L. Terens. 1966, 215p DISS-3670
in German

Descriptors: *Arc discharge, *Argon plasma, *Langmuir probe, Arc, Argon, Charge, Density, Discharge, Electron, Investigation, Ionization, Long, Plasma, Pressure, Probe, Rotation, Temperature.

For abstract, see STAR 05 17.
N67-30765 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT ON THE PULSED PLASMA ACCELERATOR (REPPAC) SUMMARY REPORT.
General Electric Co., Philadelphia, Pa. Missile and Space Div.
For primary bibliographic entry see Field 21C.
For abstract, see STAR 05 17.
N67-30803 HC$3.00 MF$0.65

TABLES OF THE COMPOSITION AND TRANSPORT COEFFICIENTS OF PARTIALLY IONIZED ARGON.
Stanford Univ., Calif. Dept. of Aeronautic and Astronautics.
R. S. Devoto. 1967, 7p NASA-CR-85559, SU-DAER-217
Contract NGR-05-020-091

Descriptors: *Argon, *Chemical composition, *Chemical equilibrium, *Ionized gas, *Transport coefficient, Ambipolar, Chemical, Chemistry, Coefficient, Composition, Conductivity, Diffusion, Electricity, Equilibrium, Gas, Ionized, Pressure, Reactivity, Table, Thermal, Translation, Transport, Viscosity.

For abstract, see STAR 05 17.
N67-30875 HC$3.00 MF$0.65

ELECTRON FLOW IN LOW-DENSITY ARGON GAS INCLUDING SPACE-CHARGE AND ELASTIC COLLISIONS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
C. M. Goldstein. Jul 67, 19p NASA-TN-D-4087

Descriptors: *Elastic collision, *Low density gas, *Monte carlo method, *Space charge, Argon, Charge, Collision, Cross section, Current, Curve, Differential, Dimensional, Diode, Elastic, Electron, Electron flux, Emission, Flow, Flux, Gas, Low density, One, Scattering, Space, Voltage.

For abstract, see STAR 05 17.
N67-30946 HC$3.00 MF$0.65

LIGHT SCATTERING AND DRIFT INSTABILITY IN A PLASMA.
Lichtstreuung Und Driftinstabilitaet in Einem Plasma
Institut Fur Plasmaphysik G.M.B.H., Garching (West Germany).
O. Theimer. Jul 66, 67p IPP-1/48
in German, English Summary

Descriptors: *Light scattering, *Plasma diagnostics, Collisionless, Diagnostics, Dispersion, Drift, Electron, Heating, Instability, Ion, Light, Plasma, Scattering, Wave.

For abstract, see STAR 05 17.
N67-31056 HC$3.00 MF$0.65

VOLT-AMPERE CHARACTERISTICS OF CYLINDRICAL AND SPHERICAL LANGMUIR PROBES FOR VARIOUS POTENTIAL MODELS SCIENTIFIC REPORT.
Michigan Univ., Ann Arbor. Space Physics Research Lab.
W. G. Dow, E. G. Fontheim, and M. Kanal. May 67, 122p NASA-CR-85598, REPT.-06106-8-T
Grant NSG-525

Descriptors: *Langmuir probe, *Volt-ampere characteristics, Ampere, Analysis, Approximation, Characteristics, Continuity, Cylinder, Electrostatic, Function, Mott-smith form, Orbit, Plasma, Potential, Sheath, Spherical, Volt.

For abstract, see STAR 05 17.
N67-31173 HC$3.00 MF$0.65

ION CYCLOTRON WAVE GENERATION IN UNIFORM AND NONUNIFORM PLASMA INCLUDING ELECTRON INERTIA EFFECTS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. J. Reinmann, and D. R. Sigman. Jul 67, 47p NASA-TN-D-4058

Descriptors: *Ion cyclotron, *Nonuniform plasma, *Radio frequency, *Wave generation, Atom, Coil, Cold, Collision, Column, Cyclotron, Cylinder, Density, Electron, Frequency, Generation, Hydrogen, Inertia, Ion, Magnetic, Nonuniform, Plasma, Power, Radial, Radio, Temperature, Transfer, Uniform, Wave.

For abstract, see STAR 05 17.
N67-31225 HC$3.00 MF$0.65

MODERN ASPECTS OF RADIATION MAGNETOGASDYNAMICS.
Tokyo Univ. (Japan). Inst. of Space and Aeronautical Science.
S.-I. Pai. Mar 67, 43p ISAS-408, VOL. 32, NO. 1

Descriptors: *Magnetogasdynamics, *Plasma theory, *Thermal radiation, Current, Electric, Electromagnetic, Field, Fluid, Heat, Motion, Plasma, Radiation, Radiative, Theory, Thermal, Transfer, Variable, Wave.

For abstract, see STAR 05 17.
N67-31392 HC$3.00 MF$0.65

20J. Quantum Theory

A MODEL FOR ATOMIC EXCITED STATES. II. EIGENVALUES AND EIGENFUNCTIONS.
Cornell Univ., Ithaca, N. Y. Dept. of Physics.
For primary bibliographic entry see Field 7E.
AD-477 668 HC$3.00 MF$0.65

HYPERPOLARIZABILITIES OF SOME POLAR DIATOMIC MOLECULES,
For primary bibliographic entry see Field 7D.
AD-655 220 Not available from CFSTI.

FORM FACTORS AT LARGE MOMENTUM TRANSFER,
State Univ of New York Stony Brook
For primary bibliographic entry see Field 20H.
AD-655 221 Not available from CFSTI.

THEORY OF ELECTROMAGNETIC PROPERTIES OF STRONG-COUPLING AND IMPURE SUPERCONDUCTORS. II.
Illinois Univ Urbana Dept of Physics
For primary bibliographic entry see Field 20C.
AD-655 305 Not available from CFSTI.

REDUCTION OF THE ELECTROMAGNETIC VECTOR POTENTIAL TO THE IRREDUCIBLE REPRESENTATIONS OF THE INHOMOGENEOUS LORENTZ GROUP. PART II. QUANTIZATION OF THE ELECTROMAGNETIC VECTOR POTENTIAL IN AN ANGULAR MOMENTUM BASIS,
Massachusetts Inst of Tech Lexington Lincoln Lab
H. E. Moses. 18 Jul 66, 16p Rept no. JA-2788
ESD-TR-67-296
Contract AF 19 (628)-5167, ARPA Order-512
Availability: Published in Il Nuovo Cimento v48 Ser 10 p43-57 Mar 1 1967.

Descriptors: (*Photons, *Wave functions), (*Selection rules, Field theory), Electromagnetic fields, Vector analysis, Potential theory, Momentum, Annihilation reactions, Atomic energy levels, Electron transitions, Emissivity, Groups (Mathematics).

In a previous paper (AD-641 006) it was shown how the electromagnetic vector potential could be reduced to the irreducible representation of the inhomogeneous Lorentz group corresponding to particles with zero mass and spin 1, which are identified with photons. When the photon amplitudes were replaced in a suitable fashion by annihilation and creation operators, a covariant second-quantized theory was obtained in which the Lorentz condition is satisfied identically and in which the norm of the Hilbert space is positive definite. In the present paper the photon wave functions from the linear momentum representation to the angular momentum representation. The vector potential, when second quantized, then takes the form of an expansion in terms of vector spherical harmonics in which the amplitudes are annihilation and creation operators which create and destroy photons with a specific angular momentum. This expansion is a covariant quantum analogue of the expansion in multipoles of classical electromagnetic theory due to Blatt and Weisskopf and leads to the usual selection rules for atomic transitions. (Author)
AD-655 314 Not available from CFSTI.

ON THE POSSIBLE PHASE TRANSITION FOR TWO-DIMENSIONAL HEISENBERG MODELS.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20C.
AD-655 326 Not available from CFSTI.

DEPENDENCE OF CRITICAL PROPERTIES OF HEISENBERG MAGNETS UPON SPIN AND LATTICE.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20C.
AD-655 327 Not available from CFSTI.

TEMPERATURE-MODULATED REFLECTANCE OF GOLD FROM 2 TO 10 eV.
Revised ed.,
Massachusetts Inst of Tech Lexington Lincoln Lab
William J. Scouler. 20 Jan 67, 5p Rept no. JA-2928A

ESD-TR-67-303
Contract AF 19 (628)-5167
Revision of manuscript submitted 21 Oct 66.
Availability: Published in Physical Review Letters v18 n12 p445-8 Mar 20 1967.

Descriptors: (*Band theory of solids, Metals), (*Gold, Optical properties), Reflectivity, Films, Ultraviolet radiation.

The temperature-modulated reflectance, delta R/R, of gold films has been measured from 2 to 10 eV. The range of modulated reflectance experiments is thus extended into the vacuum ultraviolet. The observed structure, which is much more complex than the conventional reflectance spectra, is of considerable significance to band-structure studies. (Author)
AD-655 328 Not available from CFSTI.

ACCURATE AND STABLE NUMERICAL SOLUTIONS TO THE SCHRODINGER EQUATION,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 12A.
AD-655 439 HC$3.00 MF$0.65

NEW SOURCE FOR DYNAMICAL GRAVITATIONAL FIELDS,
Maryland Univ College Park Dept of Physics and Astronomy
J. Sinsky, and J. Weber. 13 Feb 67, 4p
AFOSR-67-1615
Grant AF-AFOSR-409-65
Availability: Published in Physical Review Letters v18 n19 p795-7 May 8 1967.

Descriptors: (*Gravity, Dynamics), (*Acoustics, Azimuth), Crystal oscillators, Detectors, Power amplifiers, Sources, Measurement, Velocity, Rupture, Stresses.

The paper describes a new source for dynamical gravitational fields consisting of an acoustically stressed volume of matter. The very-near-zone dynamical gravitational fields are measured as a function of distance and azimuthal angle, using apparatus responsive to the curvature tensor. The high frequency of 1660 cycles per second implies a new regime for gravitational technology. (Author)
AD-655 481 Not available from CFSTI.

ON THE NECESSITY OF SCHWARZSCHILD'S CRITERION FOR STABILITY,
California Inst of Tech Pasadena
For primary bibliographic entry see Field 3B.
AD-655 497 Not available from CFSTI.

SATURATION PROBLEM OF A SUM RULE OF SCALAR AND PSEUDOSCALAR SPECTRAL FUNCTIONS.
Technical rept.,
Maryland Univ College Park Dept of Physics and Astronomy
C. H. Woo. Jun 67, 10p Rept no. TR-672
AFOSR-67-1617
Grant AF-AFOSR-500-66

Descriptors: (*Pions, Interactions), (*Decay schemes, Functions), Vector analysis, Algebras, Operators (Mathematics), Quantum mechanics, Invariance.
Identifiers: Commutation relations, Current algebras, Sum rules.

A sum rule of the scalar and pseudoscalar spectral functions is studied as a possible test for the commutation relations between the fourth component of the axial vector current and the scalar and pseudoscalar densities. Approximating the spectral functions by the one pion and two pion contributions, one finds the sum rule to be badly violated. (Author)
AD-655 516 HC$3.00 MF$0.65

PROPAGATORS IN NONRELATIVISTIC QUANTUM MECHANICS,
New Hampshire Univ Durham
Laurent A. Beauregard. 23 Aug 65, 12p
AROD-3888:3
Grant DA-ARO (D)-31-124-G422
Availability: Published in American Journal of Physics v34 n4 p324-32 Apr 1966.

Descriptors: (*Quantum mechanics, Green's function), Wave functions, Matrix algebra, Hamiltonian, Transformations (Mathematics), Vector spaces, Perturbation theory.
Identifiers: Schrodinger equation, Eigenvalues.

A discussion of propagators (Green's functions) and methods for calculating them for the simplest systems in nonrelativistic quantum mechanics is given from several points of view. The relevance of such techniques to partition function calculations is pointed out. Finally, a simple perturbation theory is given for the case of the free particle. (Author)
AD-655 553 Not available from CFSTI.

A CONNECTION BETWEEN SU (3) AND O (4),
Illinois Univ Urbana Dept of Physics
D. G. Ravenhall, R. T. Sharp, and W. J. Pardee. Jul 67, 26p
Contract N00014-67-A-0305-0005

Descriptors: (*Elementary particles, Groups (Mathematics)), (*Atomic orbitals, Quantum mechanics), Hydrogen, Atomic energy levels, Operators (Mathematics), Selection rules, Transformations.

It is shown that the insertion of a barrier, in the isotropic harmonic oscillator and in the hydrogen atom, gives each system the higher symmetry usually associated with the other. The result is more general: the imposition of a reflection condition can change the symmetry from SU (3) to O (4), and vice versa. This may have implications for elementary particle symmetries. (Author)
AD-655 653 HC$3.00 MF$0.65

SIDEWISE DISPERSION RELATIONS AND THE AXIAL-VECTOR COUPLING CONSTANT,
California Univ Berkeley Coll of Engineering
K. Bardakci. 27 Oct 66, 6p
AFOSR-67-1711
Grant AF-AFOSR-232-66
Availability: Published in Physical Review v155 n5 p1788-91 Mar 25 1967.

Descriptors: (*Pions, Nuclear scattering), (*Nucleons, Meson scattering), (*Meson scattering, *Dispersion relations), Field theory, Quantum mechanics, Operators (Mathematics), Integral equations.
Identifiers: Coupling constant.

The axial-vector renormalization constant is related to low-energy pion-nucleon scattering amplitude by dispersing the axial-vector vertex in the nucleon mass and using the idea of threshold dominance. The low-energy pion-nucleon amplitude, in turn, can be related to the axial-vector renormalization, giving rise to a consistency condition involving gA/gV and the pion-nucleon coupling constant. The solution to this consistency condition is in rough agreement with the observed value. (Author)
AD-655 726 Not available from CFSTI.

FEYNMAN DIAGRAMS FOR UNITARY REPRESENTATIONS OF SL (2,C),
Imperial Coll of Science and Technology London (England)
K. Koller. Jun 67, 31p
AFOSR-67-1632
Grant AF-EOAR-12-67

Descriptors: (*Elementary particles, Field theory), (*Field theory, Diagrams), (*Nuclear scattering, Field theory), Groups (Mathematics), Meson scattering, Nucleons, Baryons, Groups (Mathematics), Moments, Quantum mechanics, Perturbation theory, Great Britain.
Identifiers: Feynman diagrams, Unitarity.

Weinberg's derivation of Feynman rules for finite dimensional representation of the Lorentz group is generalized for massive particles to infinite dimensional irreducible representations of the Lorentz group. Following Feldman and Matthews, local and causal infinite dimensional fields, quantised by a commutator, are written down for irreducible unitary representations of the principal series of SL (2,C). Feynman rules for those infinite dimensional fields are stated and three point functions and pole diagrams are given explicitly for arbitrary unitary irreducible representations of the principal series of SL (2,C). (Author)
AD-655 733 HC$3.00 MF$0.65

QUANTUM HARD-SPHERE GAS IN THE LIMIT OF HIGH DENSITIES WITH APPLICATION TO SOLIDIFIED LIGHT GASES,
Stanford Univ Calif Dept of Physics
For primary bibliographic entry see Field 20L.
AD-655 734 Not available from CFSTI.

FUBINI SUM RULES FOR VERTEX FUNCTIONS.
Revised ed.,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
I. G. Halliday, and P. V. Landshoff. May 67, 36p
AFOSR-67-1637
Grant AF-EOAR-36-65

Descriptors: (*Elementary particles, Algebras), (*Nuclear scattering, Special functions (Mathematical)), Perturbation theory, Integrals, Mesons, Interactions, Great Britain.
Identifiers: Current algebras, Sum rules, Vertex functions.

The method of Amati, Jengo and Remiddi for obtaining dispersion sum rules from current algebra is analysed in some detail, for the simple case of amplitudes connecting one particle and two currents. A simple perturbation - theory model provides a warning that the assumptions made in the derivation of the sum rules may not always be valid. When they are valid they may be used to give a derivation of the sum rules that is more direct than the one using current algebra. (Author)
AD-655 737 HC$3.00 MF$0.65

A HOMOLOGICAL APPROACH TO PARAMETRIC FEYNMAN INTEGRALS,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
For primary bibliographic entry see Field 12A.
AD-655 738 HC$3.00 MF$0.65

CONSISTENCY CONDITIONS ON MODELS FOR HIGH-ENERGY SCATTERING,
Cambridge Univ (England) Cavendish Lab
R. J. Eden. 23 Jul 66, 8p
AFOSR-67-1638
Grant AF-EOAR-36-65
Availability: Published in Journal of Mathematical Physics v8 n2 p320-6 Feb 1967.

Descriptors: (*Nuclear scattering, Mathematical models), Quantum mechanics, Field theory, Functions, Polynomials, Great Britain.
Identifiers: Analyticity, Unitarity.

From unitarity, analyticity in t, and analyticity in E, a variety of conditions can be derived for the high-energy behavior of a crossing s symmetric

two-body scattering amplitude F (E, t). These conditions are studied as consistency conditions for a class of models for high-energy scattering based on smoothly varying functions. For this class of models they lead to: (1) the Froissart bound without making explicit use of Martin's enlargment of the Lehmann ellipse, (2) conditions on the phase of the amplitude and its derivative with respect to t in the forward direction. As an example of the use of the phase conditions, it is shown how the Lehmann ellipse can be enlarged to give analyticity in the circle having the absolute value of $t < R$, where R is fixed. Although the method is different, this result is closely related to the general results of Martin, but with these smoothness assumptions a little more detail can be stated about the behavior of F (E, t). (Author)
AD-655 739 Not available from CFSTI.

VECTOR AND SPINOR CURRENT ALGEBRA AND THE N/D METHOD,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
I. T. Drummond. May 67, 26p
AFOSR-67-1640
Grant AF-EOAR-36-65

Descriptors: (*Nuclear scattering, Algebras), Elementary particles, Interactions, Vector analysis, Invariance, Mathematical models, Pions, Nucleons, Great Britain.
Identifiers: Current algebras.

An N/D model of weak amplitudes analogous to the ladder approximation of Bronzan, Gerstein, Lee and Low is discussed. It is applied to the case of vector-vector current commutators and spinor-spinor anti-commutators. The model does not of course yield the detailed assumptions of current algebra but is consistent with them. It shows how these assumptions are compatible with the analyticity properties usually assumed for invariant amplitudes. By means of the model it is possible to indicate the problems involved if a boot-strap calculation is to yield the results of current algebra. (Author)
AD-655 745 HC$3.00 MF$0.65

REPORT FROM THE INTERNATIONAL SUMMER INSTITUTE IN QUANTUM CHEMISTRY, SOLID-STATE PHYSICS, AND QUANTUM BIOLOGY HELD AT THE UNIVERSITY OF UPPSALA, UPPSALA, SWEDEN.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
27 Aug 66, 28p
Sponsored By Knut and Alice Wallenberg's Found. and Arl Its Preprint No. 179

Descriptors: *Biology, *Chemistry, *Conference, *Solid state physics, Lecture, Organization, Physics, Program, Quantum, Solid, State, Sweden.

For abstract, see STAR 05 17.
N67-30746 HC$3.00 MF$0.65

APPROXIMATE NATURAL ORBITALS FOR CARBON 1S.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 17.
N67-31103 HC$3.00 MF$0.65

NATURAL SPIN ORBITALS FOR SOME LITHIUM WAVEFUNCTIONS CONTAINING EXPLICITLY INTERELECTRONIC COORDINATES.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 17.
N67-31228 HC$3.00 MF$0.65

APPROXIMATION OF POTENTIALS BY THE POTENTIALS OF CLASS C.
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France).
For primary bibliographic entry see Field 12A.
For abstract, see STAR 05 17.
N67-31366 HC$3.00 MF$0.65

20K. Solid Mechanics

THE INELASTIC BUCKLING STRENGTH OF FABRICATED HY-80 STEEL HEMISPHERICAL SHELLS.
Research and development rept.,
Naval Ship Research and Development Center Washington D C Structural Mechanics Lab
Malcolm G. Costello, and Kanehiro Nishida. Apr 67, 50p
NSRDC-2304

Descriptors: (*Hemispherical shells, Buckling (Mechanics)), Elasticity, Steel, Tests, Stresses, Pressure, Deep submergence.
Identifiers: Steel HY-80.

Eight, 66-in.-diameter, fabricated HY-80 steel hemispherical shells designed to fail by inelastic buckling were tested to observe the effects of initial imperfections and residual stresses on elastic behavior and collapse strength. The results demonstrate that the effect of secondary moments and residual stresses on collapse strength diminish as the ratio of elastic to inelastic buckling pressure increases. It was possible to predict the collapse pressures of these models within +10 or -10 percent by utilizing imperfection analysis and extrapolating previous test results of less stable shells. Fairly good agreement was also obtained by using the same imperfection analysis to predict the membrane stresses in the center of the flat spots. Addition of the results of these tests to those obtained on shells in the less stable regions provides a basis for a reasonable collapse equation for practical spherical shells over the range of shell stability of interest to deep submergence. (Author)
AD-655 249 HC$3.00 MF$0.65

FINITE ELEMENT ANALYSIS OF AXISYMMETRIC SOLIDS WITH ARBITRARY LOADINGS,
California Univ Berkeley Structural Engineering Lab
Robert S. Dunham, and Robert E. Nickell. Jun 67, 125p Rept no. SEL-67-6
Contract N123 (60530)-55641A
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif., and Rohm and Haas Co., Huntsville, Ala.

Descriptors: (*Solids, Loading (Mechanics)), Rocket propellant grains, Fourier analysis, Series, Potential energy, Bodies of revolution, Computer programs.

The finite element method is applied to solids with an axis of material symmetry subjected to Fourier expandable thermal, body force and surface traction loadings. The governing equations are derived for triangular toroidal continuum elements and for thin conical shell elements. A computer program is described and various results are presented as verification. The program is described and a user's manual is given. A listing of the program source deck is included. (Author)
AD-655 253 HC$3.00 MF$0.65

DYNAMIC INSTABILITY OF CIRCULAR, CYLINDRICAL-SHELLS HAVING VISCOELASTIC CORES.
Revised ed.,
Polytechnic Inst of Brooklyn N Y
Carl Zweben, and Jerome M. Klosner. 14 Dec 66, 9p
AROD-4604:1
Contract DA-31-124-ARO (D)-180
Revision of manuscript submitted 28 Jul 66.
Availability: Published in AIAA Journal v5 n6 p1128-34 Jun 1967.

Descriptors: (*Cylindrical bodies, Stability), Viscoelasticity, Analysis, Stresses, Shear stresses, Structural properties, Dynamics.

An investigation has been made to determine the stabilizing effects of viscoelastic cores on the response of long, circular cylindrical shells subjected to time-dependent axial loads. A small-strain/large-rotation shell theory of the Karman-Tsien type, in which only the radial inertia terms are included, is employed to analyze the shell. The core response is determined by applying the Laplace transform to the three-dimensional, linear, viscoelastic field equations in which all inertia terms are neglected. Coupling of the structural elements is obtained by requiring that the radial displacements be compatible and that the shearing stresses vanish at the interface. (It has been shown that the most important stabilizing effect comes from the radial stress and that the shearing stress between the core and the shell can be neglected.) The radial shell deflection is approximated by using a four-term deflection function having time-dependent coefficients. By appealing to Hamilton's principle, a system of four coupled integro-differential equations of these coefficients is obtained. Studies have been made of the magnitude of the critical loads as a function of both the initial shell imperfections and the time duration of loading. (Author)
AD-655 306 Not available from CFSTI.

SOUND PRESSURE DISTRIBUTIONS AND RADIATION IMPEDANCE FOR FLEXIBLE DISKS.
Navy Underwater Sound Lab New London Conn
For primary bibliographic entry see Field 20A.
AD-655 323 HC$3.00 MF$0.65

SOUND PRESSURE DISTRIBUTIONS AND RADIATION IMPEDANCE FOR FLEXIBLE DISKS, PART II.
Navy Underwater Sound Lab New London Conn
For primary bibliographic entry see Field 20A.
AD-655 324 HC$3.00 MF$0.65

A CLASS OF E. STROEMGREN'S DIRECT ORBITS IN THE RESTRICTED PROBLEM,
Yale Univ New Haven Conn Observatory
For primary bibliographic entry see Field 22C.
AD-655 334 Not available from CFSTI.

THE EFFECT OF ORIENTATION AND IMPURITIES ON THE MECHANICAL PROPERTIES OF MOLYBDENUM SINGLE CRYSTALS,
General Electric Research Lab Schenectady N Y
For primary bibliographic entry see Field 11F.
AD-655 412 Not available from CFSTI.

THE THERMAL STRESSES IN A THICK-WALLED CONE BY THE METHOD OF FINITE DIFFERENCES.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Roger O. Weiss. May 67, 59p Rept no. TG-914
Contract NOw-62-0604
Prepared in cooperation with Maryland Univ., College Park. Computer Science Center Grant NsG-398. Master's thesis.

Descriptors: (*Conical bodies, Thermal stresses), (*Stresses, Difference equations), Thickness, Numerical analysis, Boundary value problems.

A thick-walled cone subject to arbitrary axisymmetric thermal gradients is analyzed. The displacements and stresses are determined by a computer

program which is predicated on the method of finite differences. A special direct method is utilized to solve the matrix equation. The program is used to analyze two check problems which produce an unrestrained expansion of the cone. The results for a linear temperature gradient, uniform along the length of the cone, are presented and compared to thin-shell and thick-walled cylinder calculations. The results indicate that a tensile stress concentration occurs at the inside apex of the cone. (Author)
AD-655 461 HC$3.00 MF$0.65

GRAIN BOUNDARIES IN CUBIC IONIC SOLIDS.
Iowa State Univ of Science and Technology Ames
For primary bibliographic entry see Field 20B.
AD-655 525 HC$3.00 MF$0.65

A COMPARISON OF STRESS-CONCENTRATION FACTORS IN HYPERBOLIC AND U-SHAPED GROOVES,
Frankford Arsenal Philadelphia Pa Pitman-Dunn Research Labs
P. D. Flynn, and A. A. Roll. 1967, 8p
FA-A67-7
Availability: Published in Experimental Mechanics p1-9 Jun 1967.

Descriptors: (*Rods, *Stresses), Photoelasticity, Statics, Loading (Mechanics), Test methods, Configuration.
Identifiers: Grooves.

A two-dimensional photoelastic study was made of a statically loaded tension bar with symmetrical hyperbolic grooves in series with a section containing U-shaped grooves. The influence of the depth of the grooves was examined, and stress-concentration factors were determined using the self-calibrating source of stress-concentration method. (Author)
AD-655 564 Not available from CFSTI.

SURVEY OF DEFORMATION PROCESSES AND DEFORMATION CHARACTERISTICS OF DIFFICULT TO FORM METALS.
Battelle Memorial Inst Columbus Ohio Columbus Labs
For primary bibliographic entry see Field 13H.
AD-655 623 HC$3.00 MF$0.65

THE RESISTANCE OF MATERIALS TO FRACTURE PROPAGATION AND GUNFIRE DAMAGE.
Naval Research Lab Washington D C
For primary bibliographic entry see Field 19D.
AD-655 632 HC$3.00 MF$0.65

ULTRASONIC EQUATION OF STATE OF TANTALUM.
Technical rept.,
Case Inst of Tech Cleveland Ohio
R. A. Chechile. May 67, 24p Rept no. TR-10
Contract Nonr-1141 (05)
Rept. on Solid State Physics Program.

Descriptors: (*Equations of state, Ultrasonic properties), (*Tantalum, Compressive properties), Temperature, Standards, Single crystals, Mechanical properties, Measurement, Iron.
Identifiers: Elastic constants, Pulse-echo technique.

The pressure derivatives of the elastic constants of a single tantalum crystal have been measured at room temperature by the ultrasonic pulse-echo technique. The values are: dC11/dP = 4.54 dC/dP = 1.03 dC prime/dP ! 1.01 dBS/dP = 3.19. The notation C = C44, C prime = (C11 - C12)/2, BS = (C11 + 2C12)/3 has been used. The result expressed as the equation of state, = delta V/Vo = 0.526 x 10 to the -3 power - 0.581 x 10 to the -6 power P squared (pressure in kbar), agrees with the Bridgman 1949, 30 kbar, compression result when this is corrected by using the ultrasonic coefficients of iron. (Author)
AD-655 640 HC$3.00 MF$0.65

ON NONLINEAR STEADY-STATE SOLUTIONS TO MOVING LOAD PROBLEMS.
Technical rept.,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
G. A. Hegemier. Jun 67, 26p Rept no. TR-2
AFOSR-67-1439
Grant AF-AFOSR-1226-67
See also AD-655 839.

Descriptors: (*Loading (Mechanics), Equations of motion), Solids, Structures, Structural properties, Stability, Nonlinear systems.

In certain moving load problems involving elastic solids or structures with an idealized infinite or semi-infinite spatial domain, steady-state solutions of the governing equations of motion are frequently sought as an alternative to a more complex transient analysis. In seeking a solution of this type the implication is, of course, that it represents the limit of a transient problem. While this appears to be generally true of well-posed linear elastic problems, the same cannot be said of nonlinear elastic formulations. To substantiate this point the case of an infinite length string supported by a nonlinear elastic foundation and subjected to a concentrated load moving with constant velocity is studied in this paper. It is shown that although the steady-state solution of the problem is unique for load velocities both above and below the signal velocity of the string, that above is locally unstable and therefore cannot represent the limit of transient motions. (Author)
AD-655 838 HC$3.00 MF$0.65

OPTIMUM CRITICAL IMPULSE FOR SNAP-THROUGH IN SYSTEMS OF ONE DEGREE OF FREEDOM.
Technical rept.,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
N. C. Huang, W. Nachbar, and W. Prager. Jul 67, 34p Rept no. TR-3
AFOSR-67-1511
Grant AF-AFOSR-1226-67
See also AD-655 838.

Descriptors: (*Loading (Mechanics), Dynamics), Stability, Optimization, Structures, Damping, Equations of motion, Nonlinear differential equations.

A general procedure is derived for evaluation of the optimum load history which can cause the snap-through of a nonlinear, dissipative dynamical system of one degree of freedom in such a manner that the total impulse delivered by the load is a minimum. For systems in which dissipative force either is absent or else depends linearly on velocity, the optimum load history for minimum impulse is shown to be an ideal (Dirac-delta function) impulse applied to the system at rest. For nonlinear dissipation, however, the optimum load history has, in general, loads of finite magnitude acting over finite time. A general procedure to determine the optimum load history and the minimum total impulse for nonlinear dissipation is developed. This procedure is illustrated by application to two problems: the circulation of a single pendulum with damping; the snap-through of a simple, nonlinearly viscoelastic truss. (Author)
AD-655 839 HC$3.00 MF$0.65

PROCEEDINGS OF THE CONFERENCE ON THE DESIGN OF EXPERIMENTS IN ARMY RESEARCH, DEVELOPMENT AND TESTING (11th).
Army Research Office, Durham, N. C.
For primary bibliographic entry see Field 12A.
AD-803 008 HC$3.00

EPITHERMAL AND THERMAL SPECTRUM INDICES IN HEAVY WATER LATTICES.
Aktiebolaget Atomenergi, Stockholm (Sweden).
A. Jonsson, and E. K. Sokolowski. May 67, 46p
AE-277

Descriptors: *Deuterium oxide, *Fuel element, *Lattice, *Neutron spectrum, *Zero power reactor (zpr), Collision, Computer, Deuterium, Element, Epithermal, Fuel, Geometry, Index, Isotope, Moderator, Neutron, Oxide, Pitch, Power, Probability, Program, Reactor, Resonance, Rod, Spectrum, Temperature, Thermal, Uranium, Zero.

For abstract, see STAR 05 17.
N67-30732 HC$3.00 MF$0.65

STATISTICAL ASPECTS OF COEXISTING FATIGUE FAILURE MECHANISMS IN OFHC COPPER.
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
P. J. Haagensen. Jun 67, 81p NASA-CR-66424, UTIAS-TN-112
Contract NGR-52-026-008

Descriptors: *Axial load, *Copper, *Fatigue test, *Stress analysis, *Surface layer, Amplitude, Analysis, Annealing, Axial, Cold, Compression, Constant, Endurance, Fatigue, Free, Function, Gaussian distribution, High conductivity, Layer, Load, Log, Mean, Normal, Oxygen, Stress, Surface, Tension, Test, Weibull distribution, Working, Zero.

For abstract, see STAR 05 17.
N67-30863 HC$3.00 MF$0.65

TIME DEPENDENT MECHANICAL STRENGTH OF ORIENTED MEDIA.
Minnesota Univ., Minneapolis.
C. C. Hsiao, H. H. Kausch Von Schemeling, and S. R. Moghe. Dec 66, 19p NASA-CR-85767, TR-109
Contract NGR-24-005-070

Descriptors: *Fracture mechanics, *Mechanical property, *Solids, *Time dependency, Dependency, Fracture, Mathematics, Mechanical, Mechanics, Model, Molecular, Orientation, Polymer, Property, Strength, Stress, Time.

For abstract, see STAR 05 17.
N67-31095 HC$3.00 MF$0.65

ANALYSIS OF ELASTIC-PLASTIC SHELLS OF REVOLUTION UNDER AXISYMMETRIC LOADING BY THE FINITE ELEMENT METHOD.
California Univ., Berkeley. Structural Engineering Lab.
M. Khojasteh-bakht. Aug 67, 164p NASA-CR-85735, SESM-67-8
Grant NSG-274-S-2

Descriptors: *Body of revolution, *Elastoplasticity, *Shell theory, Axisymmetry, Body, Deformation, Displacement, Element, Finite, Loading, Method, Revolution, Shell, Stiffness, Strain, Stress, Theory.

For abstract, see STAR 05 17.
N67-31104 HC$3.00 MF$0.65

CREEP DEFORMATION AND BUCKLING OF A CIRCULAR CYLINDRICAL SHELL UNDER AXIAL COMPRESSION.
Aeronautical Research Inst. of Sweden, Stockholm.
A. Samuelson. 1967, 27p FFA-108

Group 20K—Solid mechanics

Descriptors: *Axial compression, *Circular cylinder, *Creep buckling, *Cylindrical shell, Aluminum, Analysis, Axial, Buckling, Circular, Compression, Computer, Creep, Cylinder, Deflection, Deformation, Distribution, Fortran, Membrane, Pressure, Program, Shell, Stress, Test.

For abstract, see STAR 05 17.
N67-31171 HC$3.00 MF$0.65

STRUCTURAL ANALYSIS AND MATRIX INTERPRETIVE SYSTEM (SAMIS) USER REPORT.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
T. E. Lang. 1 Mar 67, 158p NASA-CR-85703, JPL-TM-33-305
Contract NAS7-100

Descriptors: *Computer program, *Data processing, *Structural engineering, Analysis, Computer, Data, Element, Engineering, Input, Loading, Matrix, Output, Preparation, Processing, Program, Shell, Stress, Structural, System.

For abstract, see STAR 05 17.
N67-31177 HC$3.00 MF$0.65

CREEP DEFORMATION AND BUCKLING OF A COLUMN WITH AN ARBITRARY CROSS SECTION.
Aeronautical Research Inst. of Sweden, Stockholm.
A. Samuelson. 1967, 31p FFA-107

Descriptors: *Column, *Creep buckling, Analysis, Arbitrary, Buckling, Computation, Creep, Cross, Cross section, Distribution, Equation, Fortran, Model, Prediction, Program, Secondary, Section, Stress.

For abstract, see STAR 05 17.
N67-31204 HC$3.00 MF$0.65

EFFECT OF PLATE THICKNESS ON THE BENDING STRESS DISTRIBUTION AROUND THROUGH CRACKS.
Lehigh Univ., Bethlehem, Pa. Dept. of Applied Mechanics.
R. J. Hartranft, and G. C. Sih. Jun 67, 42p
NASA-CR-85751, TR-1
Contract NGR-39-007-025

Descriptors: *Bending theory, *Crack, *Perforated plate, *Stress distribution, Bending, Distribution, Effect, Fracture, Mechanics, Perforation, Plate, Slot, Strength, Stress, Theory, Thickness.

For abstract, see STAR 05 17.
N67-31304 HC$3.00 MF$0.65

ANALYSIS OF STRUCTURAL RESPONSE WITH DIFFERENT FORMS OF DAMPING.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
R. R. Reed. Jul 67, 56p NASA-TN-D-3861

Descriptors: *Analytic function, *Damping, *Missile design, Design, Force, Function, Hysteresis, Missile, Slip, Spring, Vibration, Viscous.

For abstract, see STAR 05 17.
N67-31401 HC$3.00 MF$0.65

SOME MODIFICATIONS OF SIMPLE DESCRIPTIONS OF YIELDING AT CRACK TIPS.
Stanford Research Inst., Menlo Park, Calif.
B. R. Baker. 26 May 67, 31p NASA-CR-66400, REPT.-3
Contracts NAS1-5885, PROJ. 5958

Descriptors: *Crack propagation, *Elastic plate, *Mathematical model, *Plastic deformation, *Yield strength, Computer, Crack, Deformation, Discontinuity, Displacement, Distribution, Ductility, Elastic, Linear, Load, Material, Mathematics, Measurement, Method, Model, Modification, Plastic, Plate, Program, Propagation, Shear, Strain, Strength, Structural, Tangent, Theory, Thin, Tip, Transverse, Yield, Zone.

For abstract, see STAR 05 17.
N67-31476 HC$3.00 MF$0.65

A LARGE DEFLECTION ANALYSIS METHOD FOR ELASTIC-PERFECTLY PLASTIC CIRCULAR PLATES.
Technical rept.,
Illinois Univ., Urbana. Dept. of Civil Engineering.
J. G. Crose, and A. H. S. Ang. Jun 67, 113p
Structural Research Ser-323
Grant NSF-GK-589

Descriptors: (*Metal plates, Mathematical models), (*Deflection, Analysis), Mechanical properties, Theses, Plasticity, Elasticity, Structural parts, Stresses, Strain (Mechanics), Computer programs, Ductility.

A numerical technique has been presented to analyze elastic-plastic plates without the usual assumptions of small deflections. By using a lumped-parameter model the continuous plate is replaced by one with a finite number of degrees of freedom. The field equations are then derived directly from the model for large deflection geometry. These equations turn out to be a finite difference approximation to the corresponding 'exact' differential equations. Hence, a solution formulated through the model can be shown to tend to the corresponding problem of a continum. Although the solution method is described and used herein for circular plates of elastic-perfectly plastic material, the method is equally applicable for other material equations.
PB-175 611 HC$3.00 MF$0.65

DEFORMATION TWINNING IN Ni AND F.C.C.Fe-Ni ALLOYS,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
For primary bibliographic entry see Field 11F.
PB-175 619 HC$3.00 MF$0.65

20L. Solid-State Physics

THEORETICAL AND EXPERIMENTAL STUDIES CONCERNING RADIATION DAMAGE IN SELECTED COMPOUND SEMICONDUCTORS.
Interim progress rept. no. 8, 30 Mar-30 Jun 59,
Battelle Memorial Inst., Columbus, Ohio.
R. K. Willardson, and F. J. Reid. Jun 59, 45p
Contract AF 33 (616)-3747

Descriptors: (*Semiconductors, Determination), Radiation damage, Theory, Experimental data, Tests, Neutrons, Electrical properties, Gallium arsenides, Aluminum compounds, Antimony.

The objective of this work is to investigate the nature of defects introduced when a wide-band-gap compound semiconductor such as AlSb, GaAs, or InP is irradaiated with fast neutrons. The problem is approached from the experimental as well as from the theoretical standpoint. The experimental approach is concerned chiefly with the effects of radiation damage on electrical properties and how these may be related to a microscopic picture of the defects. The theoretical approach is concerned with methods of calculating the number of defects produced. (Author)
AD-219 228 HC$3.00

INVESTIGATION OF ULTRA HIGH VACUUM SPUTTERED THIN FILMS.
Scientific rept. no. 2, May-30 Nov 64,
Mallory (P.R.) and Co., Inc., Burlington, Mass.
S. P. Wolsky. 30 Nov 64, 35p
AFCRL-64-977
Contract AF 19 (628)-3840

Descriptors: (*Germanium, Films), (*Films, Material forming), (*Semiconducting films, Sputtering), Low-pressure research, Electron diffraction analysis, Electrical properties, Epitaxial growth, X-ray diffraction analysis, Semiconductors.
Identifiers: Substrates (Electronics).

Germanium films were sputtered onto quartz and self-substrates in a low-pressure thermionically supported discharge. Reflection electron diffraction and x-ray examination showed that over comparable temperature ranges the orientation of sputtered germanium on quartz films differed from that of evaporated films. Epitaxy was observed on self-substrates at 150C. Electrical characteristics of evaporated and sputtered films were strikingly similar despite wide variation in substrate material and temperature and in deposition rates. (Author)
AD-454 939 HC$3.00

FERMI SURFACE IN GALLIUM DETERMINED FROM THE RADIO-FREQUENCY SIZE EFFECT,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Akira Fukumoto, and M. W. P. Strandberg. 15 Aug 66, 9p
Contract DA-36-039-AMC-03200 (E)
Availability: Published in The Physical Review v155 n3 p685-93 Mar 15 1967.

Descriptors: (*Gallium, *Band theory of solids), Single crystals, Surfaces, Determination, Radiofrequency, Magnetic fields, Measurement.

The extremal cross sections of the Fermi surface (FS) in a gallium single crystal were measured by using the radio-frequency size effect (RFSE), with rf frequencies of 2-8 MHz. The single crystal was grown in a shape of a plate with thickness approximately equal to 0.2 mm, and its crystal axis was verified within one degree of arc. The derivative of the real part of the surface impedance of the plate with respect to the magnetic field was measured, and the RFSE signals of various line shapes were observed for magnetic fields below 500 G. An interpretation of these line shapes is given. The results of the experiment are compared with the FS predicted from calculations using an augmented-plane-wave (APW) expansion for the wave functions carried out by Wood and with the results of several other experimental methods. The comparisons show that the APW predictions for E sub F = 0.400 Ry are quite accurate for some bands. The APW band 7 is verified in three orthogonal planes with an accuracy better than 30%. The APW band 5 is verified in two orthogonal planes, and the deviation is less than 25%. The APW band 8 is verified in a plane with an accuracy of better than 10%. The existence of the APW band 6 is strongly indicated in two orthogonal planes, and its topology is suggested by the experiment. (Author)
AD-655 210 Not available from CFSTI.

ESR STUDY OF MANGANESE-DOPED ALPHA-ZINC SILICATE CRYSTALS,
Cornell Univ Ithaca N Y Baker Lab of Chemistry
Harolyn King Perkin, and M. J. Sienko. 23 Sep 66, 7p
AFOSR-67-1572
Grant AF-AFOSR-796-65
Availability: Published in Journal of Chemical Physics v46 n6 p2398-2401 Mar 15 1967.

Descriptors: (*Manganese, *Electron spin resonance), (*Silicates, Impurities), (*Zinc compounds, Silicates), Crystal growth, Crstal lattice defects, Line spectrum, Phosphorescent materials.
Identifiers: Zinc silicate.

Single crystals of dilute manganese-doped alpha-Zn2SiO4 were grown hydrothermally and from the melt. ESR spectra were examined at 9.5 and 35 Gc/sec. Results are interpreted in terms of Mn (2+) at two environmentally different sites, having D parameters 729 plus or minus 8 and 413 plus or minus 5 G, respectively. The relative population of the two sites appears to be independent of total manganese concentration or method of crystal growth. It is believed that the two sites correspond to substitution of M2 (2+) for Zn (z+) at two crystallographically nonequivalent zinc positions in the willemite structure. (Author)
AD-655 217 Not available from CFSTI.

FERROMAGNETIC RESONANCE OF He3-IRRADIATED THIN METAL FILMS,
Naval Research Lab Washington D C
Glenn C. Bailey, Albert I. Schindler, and Paul H. E. Meijer. 2 Jun 67, 25p Rept no. NRL-6512

Descriptors: (*Metal films, *Radiation damage), (*Magnetic resonance, Metal films), Charged particles, Helium, Iron, Iron alloys, Nickel, Nickel alloys, Electron spin resonance, Stresses, Substrates, Magnetic fields.

Ferromagnetic-resonance measurements at 9.5 GHz were made on a number of films of pure iron and pure nickel, and alloys of iron and nickel (Permalloy) before and after 2-MeV He3-particle irradiation. In general, H0 decreased (by about 2 oe, 35 oe, and 15 oe for the iron, Permalloy, and nickel films, respectively) as a result of the irradiation, except for the composition range between 26 and 37 percent Ni, where H0 increased. Also, the half-width generally decreased with irradiation. For the pure iron and nickel films, the changes in H0 can be attributed to changes in the radially isotropic stress in the plane of the film, and in the uniaxial anisotropic field. For the alloy films where irradiation-produced ordering may occur, Ms, as well as the above parameters, may also change. The changes in H0 were different for films of a given set evaporated onto various substrates (soft glass, fused quartz, single-crystal quartz, and copper). Irradiating a film (or reirradiating a previously irradiated film) in a magnetic field also rotated the easy axis of the film into the direction of the field applied during irradiation. The rotation of the easy axis was observed over the entire composition range from pure iron to pure nickel. For the pure iron and pure nickel films, the rotation can be explained only on the basis of alignment of defects in the film during irradiation. For the Permalloy films, a short-range directional ordering effect might also apply. The variation with composition of the values of uniaxial anisotropic field after irradiation agree qualitatively with the values obtained by others using static techniques. (Author)
AD-655 234 HC$3.00 MF$0.65

THEORY OF ELECTROMAGNETIC PROPERTIES OF STRONG-COUPLING AND IMPURE SUPERCONDUCTORS. II.
Illinois Univ Urbana Dept of Physics
For primary bibliographic entry see Field 20C.
AD-655 305 Not available from CFSTI.

PARALLEL OBLIQUE-INCIDENCE ANISOTROPY IN NiFe FILMS.
Meeting speech,
Massachusetts Inst of Tech Lexington Lincoln Lab
Thomas S. Crowther, and Mitchell S. Cohen. 1967, 3p Rept no. MS-1764
ESD-TR-67-271
Contract AF 19 (628)-5167
Availability: Published in Journal of Applied Physics v38 n3 p1352-3 Mar 1 1967.

Descriptors: (*Metal films, Magnetic properties), (*Vapor plating, Anisotropy), (*Nickel alloys, Vapor plating), (*Iron alloys, Vapor plating), Optical properties, Polarization, Substrates, Thickness, Deposition, Magnetic fields, Crystal structure.
Identifiers: Dichroism, Nickel alloy 17Fe.

Magnetic films exhibiting an easy axis normal to the incidence plane (perpendicular anisotropy) when deposited at oblique incidence are well known. Anisotropic crystallite chains created by self-shadowing were postulated to explain this effect. O.se of the physical measurements supporting this model was the observation of optical dichroism. In the present work, an easy axis parallel to the incidence plane (parallel anisotropy) was found in nonmagnetostrictive films deposited at low (<45 degrees) incidence angles for certain substrate temperatures and film thicknesses. The value of Hk and direction of the easy axis in oblique incidence films was very sensitive to changes in incidence angle, substrate temperature, film thickness, and deposition rate. The magnitude of the magnetic anisotropy Hk was found to be linearly related to the magnitude of the dichroism deltagamma by the same constant, dHk/ (d (Deltagamma) = 550,000 A.Oe, for oblique incidence films having either parallel or perpendicular anisotropy. This result furnishes strong support for the view that parallel, like perpendicular oblique incidence anisotropy, originates in anisotropic microstructure, e.g., columnar growth. The resultant anisotropy is thus the result of a delicate balance between the crystallite chains and the columns. (Author)
AD-655 325 Not available from CFSTI.

TEMPERATURE-MODULATED REFLECTANCE OF GOLD FROM 2 TO 10 eV.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20J.
AD-655 328 Not available from CFSTI.

LORENTZ-LORENZ FUNCTION FOR SOLID ARGON,
California Inst of Tech Pasadena Div of Chemistry and Chemical Engineering
C. J. Pings. 14 Oct 66, 3p
AFOSR-67-1598
Contract AF 49 (638)-1273
Availability: Published in Physica v33 p473-4 1967.

Descriptors: (*Solidified gases, Argon), (*Argon, Refractive index), Cryogenics, Density, Pressure, Tables.
Identifiers: Lorentz-Lorenz law.

The Lorentz-Lorenz function for solid argon was computed for 34 temperature and pressure states in the ranges 78.10-83.81K and 0.97-71.13 atmospheres. The computed values range from 4.146-4.152 cu cm/mole; the mean is 4.1498. (Author)
AD-655 330 Not available from CFSTI.

FOREIGN SCIENCE BULLETIN, VOL. 3, NO. 6, 1967.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 20E.
AD-655 339 HC$3.00 MF$0.65

PHOTOGENERATION OF CHARGE CARRIERS IN ANTHRACENE,
New York Univ N Y Radiation and Solid State Lab
Nicholas Geacintov, and Martin Pope. 1 Aug 66, 5p
AROD-4542:3
Contract DA-31-124-ARO (D)-448, ARPA Order-0462
Availability: Published in J. Chem. Phys. v45 p3884-5 1966.

Descriptors: (*Anthracenes, *Carriers (Semiconductors)), (*Photoconductivity, Anthracenes), (*Fluorescence, Anthracenes), Excitation, Single crystals, Band theory of solids, Transport properties.
Identifiers: Quantum efficiency.

The wavelength dependence of the photocurrent in anthracene was determined for 40,000 to 49,000/cm range. The photocurrents of the illuminated electrode at both positive and negative potential were examined. Except for the fact that the fluorescence efficiency of anthracene was found to not vary with wave length, the results were very similar to those previously obtained with tetracene (see AD-644 240). Possible interpretations are discussed.
AD-655 411 Not available from CFSTI.

ELECTRIC CURRENTS IN ORGANIC CRYSTALS,
New York Univ N Y
For primary bibliographic entry see Field 7E.
AD-655 413 Not available from CFSTI.

MICROWAVE MEASUREMENTS OF THE SURFACE IMPEDANCE OF SUPERCONDUCTING TIN AND LEAD.
Stanford Univ Calif High Energy Physics Lab
For primary bibliographic entry see Field 20C.
AD-655 452 HC$3.00 MF$0.65

REBINDER EFFECTS IN MgO.
Martin Co Baltimore Md Research Inst for Advanced Studies
For primary bibliographic entry see Field 20B.
AD-655 455 HC$3.00 MF$0.65

BONDING, STRUCTURE AND MECHANICAL BEHAVIOR OF VANADIUM CARBIDE 9SINGLE CRYSTALS.
Martin Co Baltimore Md Research Inst for Advanced Studies
For primary bibliographic entry see Field 20B.
AD-655 456 HC$3.00 MF$0.65

POSITRON LIFETIMES IN METALS,
Brandeis Univ Waltham Mass
For primary bibliographic entry see Field 20H.
AD-655 478 Not available from CFSTI.

MAGNETIC SUSCEPTIBILITY OF URANIUM TRIFLUORIDE IN THE RANGE 2-300K,
Cornell Univ Ithaca N Y Baker Lab of Chemistry
For primary bibliographic entry see Field 7D.
AD-655 517 Not available from CFSTI.

TWO-PHOTON ABSORPTION IN ANTHRACENE.
Rochester Univ N Y Inst of Optics
For primary bibliographic entry see Field 7E.
AD-655 542 Not available from CFSTI.

THERMAL CONDUCTIVITY OF SOME ALKALI HALIDES CONTAINING DIVALENT IMPURITIES. II. PRECIPITATE SCATTERING,
Northwestern Univ Evanston Ill Dept of Physics
John W. Schwartz, and Charles T. Walker. 24 Oct 66, 14p
AROD-5285:2
Contract DA-31-124-ARO (D)-330
Availability: Published in The Physical Review v155 n3 p969-79 Mar 15 1967.

Descriptors: (*Alkali metal compounds, *Thermal conductivity), (*Crystal lattice defects, Interactions), (*Phonons, Scattering), Potassium compounds, Bromides, Chlorides, Impurities, Barium, Strontium, Chemical precipitation, Rayleigh scattering, Dislocations, Annealing, Resonance, Cryogenics.

Identifiers: Potassium bromide, Potassium chloride.

The lattice thermal conductivity of quenched and annealed KCl and KBr containing Ba (++) or Sr (++) was measured over the temperature range of 0.35-10K. Quenched crystals have a conductivity which one expects for phonon scattering by precipitates about 100 A in size, being Rayleigh-like at lowest temperatures and geometrical at higher temperatures. Annealed crystals have a conductivity which is a mixture of precipitate, dislocation, and stacking-fault scattering of phonons. The precipitate scattering shows up best in annealed crystals when the precipitate's crystal structure most nearly matches the host's. If the mismatch is large, then dislocation-type scattering dominates. It is proposed that precipitation of divalent impurities in alkali halides occurs in two stages. In the early stages precipitates form at selected regions of the crystal, are about 100 A in size, and scatter phonons as one would expect they should. In the late stages, when many of the divalent ions are out of solid solution, the precipitates are larger and the dislocations and stacking faults surrounding them dominate the phonon scattering. (Author)
AD-655 544 Not available from CFSTI.

MASS INDEPENDENCE OF U-CENTER-INDUCED PHONON RESONANCES IN KI,
Northwestern Univ Evanston Ill Dept of Physics
Lee G. Radosevich, and Charles T. Walker. 7 Nov 66, 5p
AROD-5285:3
Contract DA-31-124-ARO (D)-330
Availability: Published in Physical Review v156 n3 p1030-1 Apr 15 1967.

Descriptors: (*Potassium compounds, Thermal conductivity), (*Phonons, Scattering), Impurities, Crystal lattice defects, Cryogenics, Resonance.
Identifiers: Potassium iodide.

Low-temperature thermal-conductivity measurements have been made on KI containing U centers, with both H- and D-impurity ions being studied. A phonon resonance at 6 x 10 to the 12th power rad/sec is observed for both impurities; thus, there is no observable impurity mass effect. This frequency is virtually identical with the splitting between the main infrared U-center peak and the high-frequency sidebands in KI. In order to fit the data it was necessary to introduce a temperature-dependent term into the resonance scattering cross section. (Author)
AD-655 545 Not available from CFSTI.

THERMAL CONDUCTIVITY OF SOME ALKALI HALIDES CONTAINING DIVALENT IMPURITIES. I. PHONON RESONANCES,
Northwestern Univ Evanston Ill Dept of Physics
John W. Schwartz, and Charles T. Walker. 22 Sep 66, 14p
AROD-5285:1
Contract DA-31-124-ARO (D)-330
Availability: Published in The Physical Review v155 n3 p959-69 Mar 15 1967.

Descriptors: (*Alkali metal compounds, *Thermal conductivity), (*Crystal lattice defects, Interactions), (*Phonons, Scattering), Resonance, Sodium chloride, Potassium compounds, Bromides, Chlorides, Impurities, Cryogenics.
Identifiers: Potassium bromide, Potassium chloride.

Thermal-conductivity measurements were made on KCl, KBr, and NaCl containing divalent impurities. In all cases dips in the plots of thermal conductivity versus temperature are observed in the temperature range 25-50K. The data are understood in terms of a model due to Krumhansl, in which resonant phonon scattering due to changed force constants is considered. Within the framework of this model, resonant frequencies of the order of 40-90/cm, depending on the host lattice, are deduced. For crystals where the divalent impurity is the same size as the host ion, the scattering is postulated as being caused largely by the accompanying positive-ion vacancy. When the divalent ion has a size different from the host, the situation is more complicated and cannot be simply understood. (Author)
AD-655 546 Not available from CFSTI.

NEW KIND OF FIELD INSTABILITY IN CdS IN THE RANGE OF NEGATIVE DIFFERENTIAL RESISTIVITY,
Delaware Univ Newark Dept of Physics
K. W. Boer. 27 Mar 67, 7p Rept no. TR-15, TR-19
Contracts DA-31-124-ARO (D)-173, Nonr-4336 (00)
Availability: Published in Solid State Communications v5 p467-9 1967.

Descriptors: (*Cadmium sulfides, Transport properties), Carriers (Semiconductors), Resistance (Electrical), Electric fields, Oscillation, Stability, Anomalies, Photoconductivity.
Identifiers: Semiconductor junctions.

Subdomains are observed, which occur within the high field domain of CdS and move from the anode to the cathode edge of the main domain, indicating a p-type transport mechanism and causing higher frequency oscillations super imposed on the current oscillations due to main domain creation and annihilation. (Author)
AD-655 559 Not available from CFSTI.

EXCHANGE CONTRIBUTION TO THE D-PARAMETERS OF Fe (3+) AND Cr (3+) IN EUROPIUM GALLIUM GARNET.
Revised ed.,
California Univ Los Angeles Dept of Physics
M. Tachiki, and Z. Sroubek. 16 Mar 67, 4p
Contract Nonr-233 (88)
Revision of manuscript submitted 17 Feb 67. Research supported in part by NSF.
Availability: Published in Solid State Communications v5 p361-3 1967.

Descriptors: (*Garnet, *Crystal lattice defects), (*Iron, Paramagnetic resonance), (*Chromium, Paramagnetic resonance), Europium compounds, Gallium compounds, Impurities, Solid solutions, Atomic orbitals, Interactions.

The magnitudes of the D-parameter of Fe (3+) and Cr (3+) in EuGaG are significantly different from those in the other diamagnetic and weakly paramagnetic rare earth garnets. It is shown that this experimental result can be explained by the orbitally dependent exchange interaction between the Fe (3+) or Cr (3+) ion and the Eu (3+) ion, which contributes mainly to the D shift. (Author)
AD-655 673 Not available from CFSTI.

CRYSTAL SYMMETRY, OPTICAL PROPERTIES, AND FERROELECTRIC POLARIZATION OF Bi4Ti3O12 SINGLE CRYSTALS,
Air Force Avionics Lab Wright-Patterson AFB Ohio
S. E. Cummins, and L. E. Cross. 27 Oct 66, 5p
Rept no. AFAL-TR-67-50
Availability: Published in Applied Physics Letters v10 n1 p14-6 Jan 1 1967.

Descriptors: (*Bismuth compounds, *Ferroelectric crystals), (*Titanates, Ferroelectric crystals), Symmetry (Crystallography), Optical properties, Polarization, Single crystals, Ferroelectricity.
Identifiers: Bismuth titanates.

Optical and electrical measurements on thin sections of Bi4Ti3O12 in orientations not previously measured yielded the following results. The symmetry is monoclinic, point group m. The spontaneous polarization Ps is greater than 30 micro-C/sq cm and lies in a direction tilted slightly from the major crystal surface. Switching, with fields perpendicular to the major crystal surface, occurs by a small 'rocking' of this large Ps vector. The large component parallel to the major crystal surface can also be switched with high fields. Thus, there are four possible spontaneous polarization directions in the virgin crystal giving rise to complex domain structures. (Author)
AD-655 688 Not available from CFSTI.

ON THE INTERPRETATION OF THE FACTOR GROUP SPLITTING IN NAPHTHALENE CRYSTAL,
Chicago Univ Ill Inst for the Study of Metals
R. Silbey, J. Jortner, M. Valas, and S. A. Rice. 28 Nov 66, 5p
AFOSR-67-1671
Grant AF-AFOSR-781-67
Availability: Published in Molecular Crystals v2 p385-7 1967.

Descriptors: (*Naphthalenes, *Excitons), Band theory of solids, Deuterated compounds, Transport properties, Spectroscopy.

Calculations of the effect of ion pair exciton and mutual exciton mixing are consistent with the spectra of both crystalline perdeuteronaphthalene and crystalline perhydronaphthalene. (Author)
AD-655 720 Not available from CFSTI.

HIGH-MAGNETIC-FIELD STUDIES OF ORTHORHOMBIC AND RHOMBOHEDRAL Al2-xFexO3 COMPOUNDS,
Massachusetts Inst of Tech Cambridge National Magnet Lab
M. Schieber, R. B. Frankel, N. A. Blum, and S. Foner. 1967, 3p
AFOSR-67-1688
Contract F44620-67-C-0047
Availability: Published in Journal of Applied Physics v38 n3 p1282-3 Mar 1 1967.

Descriptors: (*Aluminum compounds, *Crystal structure), (*Iron oxides, Crystal structure), Mossbauer effect, Magnetic properties, Ferromagnetic materials, Piezoelectric crystals, Nuclear spins.
Identifiers: Aluminum iron oxides.

Mossbauer and magnetic susceptibility experiments at temperatures down to 4.2K and in external fields up to 140 kOe show orthorhombic Al2-xFexO3 ($0.6 < x < 1.0$) to be a collinear highly anisotropic ferrimagnet; the material is also piezoelectric and has magnetic properties similar to those of the isomorphous compound GaFeO3. Rhombohedral Al1.6Fe0.4O3 is paramagnetic above 80K and at 412K exhibits a Mossbauer spectrum characteristic of a nonunique hyperfine field; the application of an external magnetic field produces a spectrum with an enhanced Delta m=0 line which suggests a canted spin structure similar to that in the high-temperature phase ($T < 260$K) of alpha-Fe2O3. (Author)
AD-655 721 Not available from CFSTI.

FERROMAGNETISM IN Au4V,
California Univ San Diego La Jolla
For primary bibliographic entry see Field 20C.
AD-655 727 Not available from CFSTI.

QUANTUM HARD-SPHERE GAS IN THE LIMIT OF HIGH DENSITIES WITH APPLICATION TO SOLIDIFIED LIGHT GASES,
Stanford Univ Calif Dept of Physics
R, K. Cole, Jr. 28 Sep 66, 10p
AFOSR-67-1667
Contract AF 49 (638)-1389
Availability: Published in Physical Review v155 n1 p114-21 Mar 5 1967.

Descriptors: (*Solidified gases, *Quantum mechanics), (*Helium, Solidified gases), (*Hydrogen, Solidified gases), (*Deuterium, Solidified gases),

Quantum statistics, Interactions, Theory, Crystal lattices, Phonons, Perturbation theory, Thermodynamics, Specific heat, Bosons, Fermions.

The properties of a quantum hard-sphere gas in the limit of high densities are investigated, with particular emphasis on the ground-state energy per particle. A model of hard spheres arranged in a simple cubic lattice is solved by reduction to the known one-dimensional case, and gives Asc = pi sq. For more realistic close-packed systems we estimate Acp approx. = 10 to 15. This form connects smoothly to the well-known low-density gas-parameter expansions. Phonon properties in the Debye approximation are derived. The model is applied to the zero-point kinetic energies of hexagonal-centered-cubic (hcp) 3He, 4He, H2 and D2, as determined from pressure data. The helium data give A approx. = 15.7, the hydrogen data A approx. = 15.9. The fitted hard-core diameters, 1.73 A and 1.90 A, respectively, are smaller than expected from accepted potentials; this is discussed. Thermodynamics of the simple cubic system give c-nu approaching infinity T for both bosons and fermions, which may explain the anomalous (non-Debye) heat capacities of solid 3He and 4He at low temperatures. (Author)

AD-655 734 Not available from CFSTI.

AC SUPERCONDUCTING SOLENOID FOR KILOGAUSS FIELD MODULATION,

Massachusetts Inst of Tech Cambridge National Magnet Lab

For primary bibliographic entry see Field 9A.

AD-655 740 Not available from CFSTI.

ELECTRICALLY CHARGED SURFACES AND THE PHOTOGRAPHIC PROCESS,

North Carolina Univ Chapel Hill Dept of Physics

For primary bibliographic entry see Field 14E.

AD-655 753 Not available from CFSTI.

MAGNETIC PROPERTIES OF FexO AS RELATED TO THE DEFECT STRUCTURE,

Northwestern Univ Evanston Ill

F. B. Koch, and M. E. Fine. 1967, 3p

AFOSR-67-1679

Grant AF-AFOSR-327-63

Availability: Published in Journal of Applied Physics v38 n3 p1470-1 Mar 1 1967.

Descriptors: (* Iron oxides, Magnetic properties), (* Crystal lattice defects, Iron oxides), Crystal structure, Transition temperature, Ion exchange, Interactions, Antiferromagnetism.

Identifiers: Curie-Weiss law, Neel temperature.

The magnetic properties of FexO with long-range order of defects was studied. The crystal structure appears to consist of periodically spaced complexes of vacant octahedral and occupied tetrahedral sites, with most of the octahedral ions in an ideal NaCl-type environment. The Neel temperature, determined from measurements of susceptibility and modulus, increases very slightly as x is decreased. Octahedral-tetrahedral ion exchange interactions are proposed to account for the increase in Tn. The molar susceptibility obeys a Curie-Weiss law, Chi=3.56/ (T+136). With theta = 136K and Tn about 200K, theta/Tn is less than one. According to a treatment by Van Vleck one expects theta/Tn greater than one for negative first-near-neighbor and second-near-neighbor interactions. A positive first-near-neighbor interaction may possibly arise through double exchange between fE (2+) and Fe (3+). (Author)

AD-655 757 Not available from CFSTI.

TRANSMISSION LINE MODELS OF MAGNON-PHONON MODES IN FERRITES. PART II. COUPLED MODES.

Air Force Cambridge Research Labs L G Hanscom Field Mass

For primary bibliographic entry see Field 20C.

AD-655 777 HC$3.00 MF$0.65

THERMAL DIFFUSIVITY OF CARBONS AND GRAPHITES IN THE TEMPERATURE RANGE FROM 1800 to 3300K,

Aerospace Corp El Segundo Calif Labs Div

For primary bibliographic entry see Field 11B.

AD-655 786 HC$3.00 MF$0.65

MATHEMATICAL INVESTIGATIONS OF SEMICONDUCTOR DEVICES.

International Business Machines Corp Hopewell Junction N Y East Fishkill Facility

For primary bibliographic entry see Field 9A.

AD-655 803 HC$3.00 MF$0.65

REPORT FROM THE INTERNATIONAL SUMMER INSTITUTE IN QUANTUM CHEMISTRY, SOLID-STATE PHYSICS, AND QUANTUM BIOLOGY HELD AT THE UNIVERSITY OF UPPSALA, UPPSALA, SWEDEN.

Uppsala Univ. (Sweden). Quantum Chemistry Group.

For primary bibliographic entry see Field 20J.

For abstract, see STAR 05 17.

N67-30746 HC$3.00 MF$0.65

LITERATURE SEARCH OF PHYSICAL PROPERTY DATA AND OF COMPOSITE SURFACE WORK FUNCTION MODELS SEMIANNUAL REPORT, 1 MAY - 1 NOV. 1966.

Field Emission Corp., Mcminnville, Oreg.

A. E. Bell, L. C. Crouser, B. E. Evans, C. H. Hinrichs, and L. W. Swanson. 15 Dec 66, 132p

NASA-CR-85562

Contract NAS3-8910

Descriptors: * Adsorption, * Mathematical model, * Physical property, * Surface property, * Work function, Atom, Bibliography, Composite, Desorption, Diffraction, Electron, Energy, Filament, Flash, Function, Impact, Ion, Literature, Low energy, Mathematics, Microscopy, Model, Physical, Potential, Property, Search, Surface, Work.

For abstract, see STAR 05 17.

N67-30836 HC$3.00 MF$0.65

FREE CARRIER ABSORPTION AND EFFECTIVE MASSES IN ZINC ANTIMONIDE-CADMIUM ANTIMONIDE ALLOYS.

Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering.

A. W. Carlson. May 67, 188p NASA-CR-85579, SR-3

Grant NSG-496

Descriptors: * Absorption, * Cadmium antimonide, * Mass spectroscopy, * Relaxation time, * Zinc antimonide, Alloy, Anisotropy, Antimonide, Band, Cadmium, Carrier, Conductivity, Crystal, Effectiveness, Electricity, Free, Hall coefficient, High frequency, Low frequency, Mass, Measurement, Optical, Relaxation, Spectroscopy, Tensor, Time, Valence, Zinc.

For abstract, see STAR 05 17.

N67-30887 HC$3.00 MF$0.65

MATERIALS RESEARCH AT STANFORD UNIVERSITY.

Stanford Univ., Calif. Center for Materials Research.

For primary bibliographic entry see Field 11G.

PB-174 980 HC$3.00 MF$0.65

ELECTRICAL MEASUREMENTS: CONTRIBUTED PAPERS AND DISCUSSION,

National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.

For primary bibliographic entry see Field 14B.

PB-175 620 HC$3.00 MF$0.65

20M. Thermodynamics

PARAMETRIC SOLUTION OF THE ONE-DIMENSIONAL FLOW EQUATIONS WITH HEAT ADDITION,

California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences

For primary bibliographic entry see Field 20D.

AD-655 299 Not available from CFSTI.

ANALYSIS AND EXPERIMENT OF RADIANT HEAT EXCHANGE BETWEEN SIMPLY ARRANGED SURFACES.

Technical rept. May 65-Jun 67,

Purdue Univ Lafayette Ind School of Mechanical Engineering

Raymond Viskanta, James R. Schornhorst, and Jaswant S. Toor. Jun 67, 131p

AFFDL-TR-67-94

Contract AF 33 (615)-2362

Descriptors: (* Heat transfer, Surfaces), Heat transfer coefficients, Reflection, Abrasive blasting, Steel, Monte Carlo method, Integral equations, Absorption, Emissivity, Tables.

The work reported herein covers the effort to improve the accuracy and to provide some confidence in the analytical methods for predicting radiant heat exchange among surfaces having nonelementary emission and reflection characteristics. The study consisted of an examination of the validity of commonly used simplified methods of radiant heat transfer analysis, measurements of local irradiation at a surface and Monte Carlo calculations to estimate what level of detail is important in the description of the radiation characteristics of surfaces. The radiant heat transfer problem was first formulated for a general enclosure with as few simplifying assumptions as possible and then specialized to a very simple configuration. Solutions for the local radiant heat flux and incident flux were obtained for seven different models approximating the radiation characteristics of surfaces. The local irradiation measurements were made for sandblasted stainless steel, electropolished stainless steel, rough electroplated gold, smooth electroplated gold, and PV 100 white paint over the temperature range from 50 degrees F to 850 degrees F. The predictions of the local incident flux using the diffuse, specular, and diffuse-specular models have been compared with experimental results. The Monte Carlo results showed that under some conditions the choice of the model for radiation surface characteristics can be very critical for both the local heat transfer and overall radiant interchange calculations. (Author)

AD-655 335 HC$3.00 MF$0.65

FOREIGN SCIENCE BULLETIN, VOL. 3, NO. 6, 1967.

Library of Congress Washington D C Aerospace Technology Div

For primary bibliographic entry see Field 20E.

AD-655 339 HC$3.00 MF$0.65

THE FLOW FIELD AND HEAT TRANSFER DOWNSTREAM OF A REARWARD FACING STEP IN SUPERSONIC FLOW,

Aerospace Research Labs Wright-Patterson AFB Ohio

For primary bibliographic entry see Field 20D.

AD-655 370 HC$3.00 MF$0.65

ON THE PROBLEM OF HEAT CONDUCTION IN A CONTINUOUS CYLINDER,

Aerospace Research Labs Wright-Patterson AFB Ohio

S. M. Kotlyar. Apr 67, 15p Rept no. ARL-67-0068

TT-67-62364

Trans. from Prikladna Mekhanika (USSR), v10 n5 1964.

Descriptors: (*Cylindrical bodies, *Thermal conductivity), Bessel functions, Fourier analysis, Integral equations, Series, Surface temperatures.

The first part of this paper solves the problem of determining the axially symmetric, steady state temperature field T (r,z) in an infinite homogeneous and isotropic cylinder o < or = r < or = R, - infinity < Z < + infinity provided that there is thermal contact with a medium at prescribed temperature T sub zero (z) over the part r = R, zero temperature over the remaining part of the surface. The solution is obtained in the form of a Bessel-Fourier integral involving an auxiliary function which satisfied a Fredholm integral equation of the second kind. The following part of the paper deals with the analogous question for a finite circular cylinder. This solution appears in the form of a Bessel-Fourier series with an auxiliary function satisfying a Fredholm integral equation of the second kind. (Author)
AD-655 371 HC$3.00 MF$0.65

INVESTIGATION OF THE EFFECT OF SURFACE CONDITIONS ON THE RADIANT PROPERTIES OF METALS. PART II. MEASUREMENTS ON ROUGHENED PLATINUM AND OXIDIZED STAINLESS STEEL.
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 11F.
AD-655 384 HC$3.00 MF$0.65

THIRD VIRIAL COEFFICIENT FOR AIR-WATER VAPOR MIXTURES,
Maryland Univ College Park Inst for Molecular Physics
For primary bibliographic entry see Field 7D.
AD-655 410 Not available from CFSTI.

AN EXPERIMENTAL INVESTIGATION OF A SIMPLIFIED METHOD FOR MEASURING HEAT TRANSFER AT SUPERSONIC SPEEDS,
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 20D.
AD-655 463 HC$3.00 MF$0.65

INSTABILITIES IN HIGHLY EVOLVED STELLAR MODELS.
California Inst of Tech Pasadena
For primary bibliographic entry see Field 3B.
AD-655 493 Not available from CFSTI.

ON THE INVERSION OF THE DENSITY GRADIENT AT THE FRINGE OF THE CONVECTION ZONE,
California Inst of Tech Pasadena
For primary bibliographic entry see Field 3B.
AD-655 495 Not available from CFSTI.

AN INVESTIGATION OF THE THERMODYNAMIC PROPERTIES OF SOME LIQUID TIN ALLOYS.
Denver Research Inst Colo
For primary bibliographic entry see Field 11F.
AD-655 508 HC$3.00 MF$0.65

UNSTEADY ENERGY TRANSFER IN A LAYER OF GRAY GAS BY THERMAL RADIATION,
Purdue Univ Lafayette Ind School of Mechanical Engineering
Raymond Viskanta, and Pritam S. Bathla. 30 Nov 66, 18p
AROD-4282:6
Contract DA-31-124-ARO (D)-137
Availability: Published in Journal of Applied Mathematics and Physics (ZAMP) v18 n3 p353-67 1967.

Descriptors: (*Gases, *Thermal radiation), Heat transfer, Energy, Cooling, Heating, Physical properties.

The purpose of the study is to develop further understanding of the interaction of radiation with matter under transient conditions and to determine the effect of the physical property variation with temperature on the cooling and/or heating of gas. Exact radiative transfer methods are used to formulate the unsteady energy transfer in a plane layer of radiating gas. The previous analyses are extended by considering the heating of the stagnant gas by a diffuse and a collimated radiation flux incident of the boundary from some external source as well as accounting for the variation of the physical and optical properties with temperature. The distribution of temperature as well as of local radiation flux are presented as functions of time for a range of parameters and initial conditions of physical interest. (Author)
AD-655 547 Not available from CFSTI.

ULTRASONIC EQUATION OF STATE OF TANTALUM.
Case Inst of Tech Cleveland Ohio
For primary bibliographic entry see Field 20K.
AD-655 640 HC$3.00 MF$0.65

ISOTROPY OF COSMIC BACKGROUND RADIATION AT 10,690 MHz,
Stanford Univ Calif Radio Astronomy Inst
For primary bibliographic entry see Field 3B.
AD-655 732 Not available from CFSTI.

QUANTUM HARD-SPHERE GAS IN THE LIMIT OF HIGH DENSITIES WITH APPLICATION TO SOLIDIFIED LIGHT GASES,
Stanford Univ Calif Dept of Physics
For primary bibliographic entry see Field 20L.
AD-655 734 Not available from CFSTI.

THERMAL DIFFUSIVITY OF CARBONS AND GRAPHITES IN THE TEMPERATURE RANGE FROM 1800 to 3300K,
Aerospace Corp El Segundo Calif Labs Div
For primary bibliographic entry see Field 11B.
AD-655 786 HC$3.00 MF$0.65

ON THE DIFFERENTIAL EQUATION APPROXIMATION IN RADIATIVE GAS DYNAMICS.
Final rept.,
Naval Ordnance Lab White Oak Md
Shan Fu Shen. 15 May 67, 49p Rept no. NOLTR-67-23, Aerodynamics Research-282

Descriptors: (*Thermal radiation, Gases), Differential equations, Approximation (Mathematics), Dynamics, Heat transfer, Energy.

A differential approximation for radiative transport is obtained which leads to a radiation term of the same order as the conduction term in the gas dynamic energy equation. It may be used to generate radiative energy flux and boundary conditions. As a demonstration, the plane-parallel Milne problem is worked out. (Author)
AD-655 813 HC$3.00 MF$0.65

NOZZLE FLOW OF A CHEMICALLY REACTING AND RADIATING IONIZED GAS.
Massachusetts Inst of Tech Cambridge Aerophysics Lab
For primary bibliographic entry see Field 20I.
AD-655 836 HC$3.00 MF$0.65

THERMAL CONDUCTIVITIES OF ORDINARY AND DEUTERATED GASEOUS HYDROGEN FLUORIDE AND THEIR EQUIMOLAR MIXTURE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
C. E. Baker. Jul 67, 16p NASA-TN-D-4056

Descriptors: *Deuterium fluoride, *Polar gas, *Thermoconductivity, Conductivity, Deuterium, Electromotive, Exchange, Fluoride, Force, Gas, Hydrogen, Mixture, Molecular, Polar, Property, Resonant, Thermal, Viscosity.

For abstract, see STAR 05 17.
N67-30683 HC$3.00 MF$0.65

HEAT TRANSFER ACROSS SURFACES IN CONTACT - STUDIES OF TRANSIENTS IN ONE-DIMENSIONAL COMPOSITE SYSTEMS RESEARCH REPORT, OCT. 1, 1966 - APR. 1, 1967.
Southern Methodist Univ., Dallas, Tex. Inst. of Tech.
C. J. Moore, Jr.. 28 Mar 67, 245p NASA-CR-84868, RR-67-2
Grant NSG-711

Descriptors: *Boundary value problem, *Computer method, *Slab, *Temperature distribution, Behavior, Boundary, Computer, Contact, Convection, Distribution, Heat transfer, Interface, Layer, Method, Outer, Problem, Resistance, Temperature, Thermal, Time, Transient, Two, Value.

For abstract, see STAR 05 17.
N67-30861 HC$3.00 MF$0.65

VAPOR CHAMBER FIN STUDIES. TRANSPORT PROPERTIES AND BOILING CHARACTERISTS OF WICKS.
Pratt and Whitney Aircraft, East Hartford, Conn.
B. H. Hilton, H. R. Kunz, L. S. Langston, G. H. Nashick, and S. S. Wyde. Jun 67, 188p NASA-CR-812, PWA-2953
Contract NAS3-7622

Descriptors: *Boiling, *Fin, *Transport property, *Vapor pressure apparatus, Apparatus, Fiber, Freon, Heat, Material, Metal, Pipe, Porosity, Powder, Pressure, Property, Screen, Sintering, Transport, Vapor, Wick.

For abstract, see STAR 05 17.
N67-31148 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF PRESSURE DROP AND HEAT TRANSFER FOR WATER BOILING IN A VERTICAL-UPFLOW SINGLE-TUBE HEAT EXCHANGER.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
T. M. Damman, and J. R. Stone. Jul 67, 35p NASA-TN-D-4057
Contract 120-27-02-03-22

Descriptors: *Boiler, *Heat transfer, *Pressure drop, *Stainless steel, *Water flow, Coefficient, Drop, Exchanger, Flow, Fluid, Heating, Pressure, Rate, Resistance, Single, Stainless, Steel, Thermal, Tube, Wall, Water.

For abstract, see STAR 05 17.
N67-31214 HC$3.00 MF$0.65

AN APPROXIMATE ANALYSIS OF THE EFFECTS OF NITROGEN INJECTION INTO THE BOUNDARY LAYER ON A GRAPHITE SURFACE IN A HIGH-TEMPERATURE DISSOCIATED AIRFLOW.
National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
K. C. Weston. Jul 67, 39p NASA-TN-D-4060

Descriptors: *Boundary layer, *Graphite, *Nitrogen, *Thermal dissociation, Airflow, Boundary, Dissociation, Heat, High temperature, Hypersonic, Injection, Layer, Mass, Point, Speed, Sphere, Stagnation, Surface, Thermal, Transfer.

For abstract, see STAR 05 17.
N67-31285 HC$3.00 MF$0.65

THERMAL ANALYZER COMPUTER PROGRAM FOR THE SOLUTION OF GENERAL HEAT TRANSFER PROBLEMS.
Lockheed-california Co., Burbank.
H. D. Schultz. 16 Jul 65, 355p NASA-CR-65581, LR-18902
Contract NAS9-3349

Descriptors: *Computer program, *Heat transfer, *Transient heating, Analysis, Capacitance, Capacity, Complex, Computer, Debugging, Heat, Lumping, Network, Parameter, Problem, Program, Resistor, Thermal, Transfer, Transient.

For abstract, see STAR 05 17.
N67-31357 HC$3.00 MF$0.65

CRYOGENIC THERMOCOUPLE THERMOMETRY,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
For primary bibliographic entry see Field 14B.
PB-175 621 HC$3.00 MF$0.65

ON THE PROBLEMS OF MEASURING TRANSIENT TEMPERATURE IN CRYOGENIC FLUIDS,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
For primary bibliographic entry see Field 14B.
PB-175 622 HC$3.00 MF$0.65

20N. Wave Propagation

THEORETICAL CALCULATION OF RF ENERGY RECEIVED FROM A TRANSMITTER BY AN ELECTROEXPLOSIVE DEVICE AND COMPUTATION OF SAFE SEPARATION DISTANCES.
Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N. J.
For primary bibliographic entry see Field 17B.
AD-450 567 HC$3.00

RUN-UP BY IMPULSIVELY GENERATED WATER WAVES.
Naval Civil Engineering Lab., Port Hueneme, Calif.
For primary bibliographic entry see Field 8C.
AD-454 728 HC$3.00

EXPERIMENTAL TEST OF THE FREUNDLICH RED-SHIFT HYPOTHESIS,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 3B.
AD-655 209 Not available from CFSTI.

SOME CONSIDERATIONS IN THE OPERATIONAL CLASSIFICATION OF SUDDEN IONOSPHERIC DISTURBANCES AND COMPUTATION OF PEAK INCREASED ABSORPTION ON HF CIRCUITS.
Booz-Allen Applied Research Inc Bethesda Md
For primary bibliographic entry see Field 4A.
AD-655 254 HC$3.00 MF$0.65

A REFORMULATED BOUNDARY PERTURBATION THEORY IN ELECTROMAGNETISM AND ITS APPLICATION TO A SPHERE,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20C.
AD-655 316 Not available from CFSTI.

ELECTROMAGNETIC SCATTERING BY REGULAR POLYHEDRA.
Final rept. 18 Apr 66-17 Apr 67,
Lockheed Missiles and Space Co Sunnyvale Calif
W. H. Watson, and N. Kusnezov. 17 Apr 67, 107p AFCRL-67-0307
Contract AF 19 (628)-5926

Descriptors: (*Electromagnetic waves, *Radar echo areas), Special functions (Mathematical), Equations, Scattering, Geometry, Theorems, Polarization, Theory.

In the report, the spherical representation method explained in 'The Method of Spherical Representation for Treating Electromagnetic Scattering', Final Report, AFCRL-66-91, April 14, 1966, by W. H. Watson, is elaborated to treat electromagnetic scattering by regular polyhedra. The distant scattered field is represented by means of generalized spherical functions so formulae can be obtained that represent backscattering cross section and target scattering matrix for arbitrary direction of incidence on the scatterer of given size relative to lambda. In Part I the geometry required for applying the method is worked out explicitly for the cube. In Part II the most general form is presented for the electromagnetic equation system satisfied by the field components that can be expressed in series of generalized spherical functions. As the result of this work electromagnetic scattering problems for scatterers not large compared with lambda can be solved in terms of spherical waves; from this solution the whole distant scattered field may be derived for any particular orientation of the scatterer and choice of incident polarization. (Author)
AD-655 390 HC$3.00 MF$0.65

WORLD MAPS OF CONJUGATE COORDINATES AND L CONTOURS,
Institute for Telecommunication Sciences and Aeronomy Boulder Colo
For primary bibliographic entry see Field 4A.
AD-655 661 Not available from CFSTI.

LOW FREQUENCY SCATTERING BY SPHEROIDS AND DISCS,
Michigan Univ Ann Arbor Radiation Lab
J. S. Asvestas, and R. E. Kleinman. Jun 67, 108p Rept no. Scientific-4, 7133-5-T
AFCRL-67-0360
Contract AF 19 (628)-4328

Descriptors: (*Electromagnetic waves, Scattering), (*Disks, Scattering), (*Bodies of revolution, Scattering), Iterative methods, Boundary value problems, Low frequency, Special functions (Mathematical), Geometry.

The problem of scattering of a scalar plane wave by a spheroid of revolution is solved for either Dirichlet or Neumann boundary conditions, arbitrary major to minor axis ratio, and arbitrary incident direction. The solution is obtained using an iterative method applied to solutions of the corresponding potential problem and is expressed as a series of products of Legendre and trigonometric functions, and ascending powers of wave number. A recursion relation for the coefficients in this series is derived. These results are employed to calculate scattering cross sections for 2:1, 5:1 and 10:1 prolate spheroids. (Author)
AD-655 782 HC$3.00 MF$0.65

SCATTERING OF ELECTROMAGNETIC WAVES BY VORTICITY FLUCTUATIONS,
Aerospace Corp El Segundo Calif Labs Div
F. S. Roehrs. Apr 67, 44p Rept no. TR-1001 (2240-20)-9
SSD-TR-67-61
Contract AF 04 (695)-1001

Descriptors: (*Electromagnetic waves, Scattering), Turbulence, Microwaves, Backscattering, Theory, Regression analysis.

A weak-probe theory was developed to describe the incoherent scatter of microwaves by the vorticity fluctuations in a shear generated turbulent flow. The theory is based on a turbulent analog to the Onsager regression hypothesis. The power spectrum of the scattered wave is determined by the regression of the turbulent fluctuations and their convective motions. The regression function is developed from the turbulent energy transfer equation, which also determines the mean square amplitude of the fluctuations. (Author)
AD-655 783 HC$3.00 MF$0.65

RANDOM SCATTERING OF QUASIMONOCHROMATIC RADIATION IN A LONG TRANSMISSION LINE.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 9A.
AD-655 789 HC$3.00 MF$0.65

EIGENELEMENTS OF THE FINITE FOURIER TRANSFORM AND THEIR APPLICATION TO ANTENNA PATTERN SYNTHESIS,
Hughes Aircraft Co Culver City Calif Antenna Dept
Thomas S. Fong. Dec 66, 59p Rept no. Scientific-8, P67-93
AFCRL-67-0342
Contract AF 19 (628)-4349

Descriptors: (*Antenna radiation patterns, *Integral transforms), Synthesis, Functions, Differential equations, Polynomials, Power series, Asymptotic series, Computer programs, Integral equations.

The eigenvalues and eigenfunctions of the finite Fourier transform corresponding to parameter c = 10 pi, 15 pi, 20 pi, and 25 pi are computed and tabulated. The computational details are given and discussed. An antenna pattern synthesis technique that makes use of these eigenelements is illustrated by examples. When the superdirective ratio is constrained to reasonable values, the number of eigenfunctions that contribute significantly to the pattern is found to be approximately equal to twice the number of wavelengths in the aperture. A pattern synthesized with the above eigenfunctions is compared with the pattern obtained by Woodward's method.
AD-655 791 HC$3.00 MF$0.65

NONLINEAR PROBLEMS IN WAVE PROPAGATION.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
K. Oswatitsch. 1967, 28p NASA-TM-X-60079, SSS-67-74

Descriptors: *Prandtl-meyer expansion, *Shock, *Three-dimensional flow, *Unsteady flow, Dimensional, Nonlinear, Prediction, Propagation, Steady, Supersonic, Theoretical, Three, Wave.

For abstract, see STAR 05 17.
N67-30906 HC$3.00 MF$0.65

DISCUSSION OF RADIO WAVE PROPAGATION EXPERIMENTS TO EXPLORE THE EARTH'S MAGNETOSPHERE.
Minnesota Univ., Minneapolis.
T. Hagfors. Aug 66, 20p NASA-CR-85845, TG-23
Contract NSR-24-005-047

Descriptors: *Experiment design, *Magnetospheric electron density, *Radio propagation, Density, Design, Distribution, Earth, Electron, Error, Experiment, Fluctuation, Frequency, Magnetos-

phere, Moon, Power, Propagation, Radio, Requirement, Transmitter, Wave.

For abstract, see STAR 05 17.
N67-31164 HC$3.00 MF$0.65

TABULATIONS OF VHF PROPAGATION DATA OBTAINED OVER IRREGULAR TERRAIN AT 20, 50, AND 100 MHz.
Technical rept.,
Institutes for Environmental Research, Boulder, Colo.
M. E. Johnson, M. J. Miles, P. L. McQuate, and A. P. Barsis. May 67, 401p ITSA-38
IER-38

Descriptors: (*Electromagnetic waves, Propagation), Colorado, Very high frequency, Wave transmission, Attenuation, Measurement, Tables, Gain, Antenna radiation patterns.

This report contains tabulations of transmission loss data resulting from propagation experiments at 20, 50, and 100 MHz conducted over irregular terrain in the Colorado high plains east of the Continental Divide. (Author)
PB-175 603 HC$3.00 MF$0.65

21. PROPULSION AND FUELS

21A. Air-Breathing Engines

METHODS FOR THE ANALYSIS OF NON-STATIONARY TIME SERIES WITH APPLICATIONS TO OCEANOGRAPHY.
Doctoral thesis,
California Univ Berkeley Hydraulic Engineering Lab
Lloyd John Brown. May 67, 140p Rept no. HEL-16-3
Contract DACW72-67-C-0002

Descriptors: (*Time series analysis, *Oceanology), Theorems, Electromagnetic fields, Stochastic processes, Approximation (Mathematics), Statistical processes, Ocean waves.

The probability structure for a type of real, mean zero, second order non-stationary stochastic process is shown to depend upon a non-stationary spectral density rho (lambda, tau) (if it exists). This dissertation treats the problem of estimating rho (lambda, tau) from a finite part of a sample function of the process. Two methods are developed: the case where rho (lambda, tau) is locally 'slowly varying', and the case where rho (lambda, tau) is 'linearly separable'. The statistical properties of these methods are investigated and approximations to the sampling distribution of the estimators are obtained for the Gaussian case. 'Spectral representations' for the estimates and their variances are obtained. A non-stationary version of the pseudo-integral representation investigated by Tukey and used by Pierson is shown to be rigorously definable and to correspond to a strongly normal non-stationary process of the type considered above. Several examples of the use of the methods are shown. In particular, the time varying spectral density of the Crescent City tsunami of May 23, 1960 is estimated. (Author)
AD-655 256 HC$3.00 MF$0.65

THRUST-LIFT INTEGRATION AND ITS CONSEQUENCES ON THE ECONOMY OF ATMOSPHERIC FLIGHT AT HIGH SPEED.
La Synthese Sustentation-propulsion Et Ses Consequences Sur l'Economie Du Vol Atmospherique A Grande Vitesse
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
P. Contensou. 1966, 36p TP-366/1966/
in French, English Summary Presented At the 5th Intern. Council of the Aeron. Sci. Meeting, London, 12-16 Sep. 1966

Descriptors: *Air breathing engine, *Air speed, *Thrust effect, Acceleration, Aerodynamic, Air, Breathing, Effect, Engine, Flow, High speed, Lift, Lifting surface, Plant, Power, Speed, Thrust.

For abstract, see STAR 05 17.
N67-30909 HC$3.00 MF$0.65

21B. Combustion and Ignition

EVALUATION OF PROCESSES OCCURRING IN PYROTECHNIC FLAMES.
Denver Research Inst Colo
For primary bibliographic entry see Field 19A.
AD-655 820 HC$3.00 MF$0.65

PROPERTIES OF CHAPMAN- JOUGUET DETONATIONS IN STOICHIOMETRIC HYDROGEN-OXYGEN MIXTURES DILUTED WITH HELIUM AND HYDROGEN INTERIM TECHNICAL REPORT.
Toronto Univ. (Ontario).
A. Benoit. Jan 67, 141p UTIAS-TN-104, ARL-67-0019
Contract AF 33/615/-2766
141 P Refs

Descriptors: *Chapman-jouget flame, *Detonation wave, *Flame propagation, *Gas mixture, *Thermodynamic property, Additive, Analysis, Combustion, Detonation, Dilution, Effect, Flame, Gas, Graph, Helium, Hydrogen, Mixture, Numerical, Oxygen, Pressure, Product, Propagation, Property, Stoichiometry, Temperature, Thermodynamic, Wave.

For abstract, see STAR 05 17.
N67-30304 HC$3.00 MF$0.65

RADIATION FROM CARBON IN A ROCKET PLUME MIXING REGION WITH COUPLED CONVECTIVE AND RADIATIVE ENERGY FLUXES AND GENERAL OPTICAL THICKNESS.
General Applied Science Labs., Inc., Westbury, N. Y.
J. D. Melnick, and S. Slutsky. Sep 66, 42p
NASA-CR-85835, TR-628
Contract NAS8-20298

Descriptors: *Plume, *Radiative heat transfer, *Rocket vehicle, Aerodynamics, Base, Carbon, Chemistry, Equation, Fuel, Heat, Hydrocarbon, Mixing, Radiation, Rate, Region, Rocket, Transfer, Transport, Vehicle.

For abstract, see STAR 05 17.
N67-31152 HC$3.00 MF$0.65

REVIEW OF THERMAL RADIATION FROM LIQUID AND SOLID PROPELLANT ROCKET EXHAUSTS.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Aero-astrodynamics Lab.
W. C. Rochelle. 20 Feb 67, 295p NASA-TM-X-53579

Descriptors: *Rocket exhaust, *Solid propellant, *Thermal radiation, Absorption, Aluminum oxide, Carbon, Emission, Exhaust, Propellant, Radiation, Rayleigh scattering, Rocket, Saturn project, Solid, Thermal, Ullage rocket.

For abstract, see STAR 05 17.
N67-31300 HC$3.00 MF$0.65

ANALYSIS OF THE TRAJECTORY, LOADS AND HEATING EXPERIENCED BY A BODY PASSING THROUGH A SUPERSONIC FLOW FIELD.
Lockheed Missiles and Space Co., Huntsville, Ala. Huntsville Research and Engineering Center.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 17.
N67-31352 HC$3.00 MF$0.65

21C. Electric Propulsion

RESEARCH AND DEVELOPMENT ON THE PULSED PLASMA ACCELERATOR (REPPAC) SUMMARY REPORT.
General Electric Co., Philadelphia, Pa. Missile and Space Div.
C. Cook, P. Gloersen, B. Gorowitz, and T. Karras. 25 Apr 67, 117p NASA-CR-72271
Contract NAS3-8906

Descriptors: *Injector, *Metal vapor, *Plasma accelerator, *Propellant, Accelerator, Liquid, Metal, Plasma, Pulse, Repetition, Vapor, Xenon.

For abstract, see STAR 05 17.
N67-30803 HC$3.00 MF$0.65

CATHODE DURABILITY TESTS IN MERCURY ELECTRON- BOMBARDMENT ION THRUSTORS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
E. V. Pawlik, and P. D. Reader. Jul 67, 32p
NASA-TN-D-4055

Descriptors: *Cathode, *Electron bombardment, *Mercury (metal), *Thrustor, Acceleration, Beam, Bombardment, Coating, Current, Diameter, Electron, Ion, Lifetime, Matrix, Mercury, Metal, Oxide, Potential, Test, Time.

For abstract, see STAR 05 17.
N67-31224 HC$3.00 MF$0.65

ACCELERATOR GRID DURABILITY TESTS OF MERCURY ELECTRON-BOMBARDMENT ION THRUSTORS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
E. V. Pawlik, and P. D. Reader. Jul 67, 30p
NASA-TN-D-4054
Contract 120-26-02-05-22

Descriptors: *Electron bombardment, *Grid, *Ion engine, Accelerator, Bombardment, Cathode, Cryogenic, Durability, Electron, Engine, Erosion, Ion, Mercury, Pumping, Spacing, Sputtering, Tank, Thrustor, Vacuum.

For abstract, see STAR 05 17.
N67-31316 HC$3.00 MF$0.65

MAGNETOPLASMADYNAMIC ARCJET THRUSTOR SEMIANNUAL REPORT, 2 MAY - 31 OCT. 1966.
Avco Corp., Wilmington, Mass. Space Systems Div.
31 Mar 67, 105p NASA-CR-85858, AVSSD-0161-67
Contract NAS3-8907

Descriptors: *Arc jet, *Magnetogasdynamics, *Thrustor, Arc, Coil, Configuration, Cooling, Discharge, Engine, Jet, Liquid, Magnet, Performance, Plasma, Propulsion, Radiation, Throat.

For abstract, see STAR 05 17.
N67-31408 HC$3.00 MF$0.65

21D. Fuels

SAFETY PROCEDURES FOR HIGH ENERGY FUELS,

Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 13L.
AD-655 423 HC$3.00 MF$0.65

FUNCTIONAL EVALUATION OF ELECTROLUMINESCENT PICTORIAL STATUS DISPLAYS.
Interim rept. (Phase 1), 1 Mar 66-15 Jul 67,
North American Aviation Inc Anaheim Calif Autonetics Div
John S. Frost, and Robert H. Wright. 15 Jul 67, 41p Rept no. C7-1794/301
Contract N00014-66-C-0135

Descriptors: (*Display systems, *Electroluminescence), (*Refueling, Monitors), (*Human engineering, Display systems), Man-machine systems, Automation, Control, Fuels, Coding.
Identifiers: Evaluation.

An electroluminescent display for pictorially presenting aircraft fuel and configuration status information was designed and fabricated, and performance with it was compared to performance with a conventional display panel containing comparable information. Slides of comparable configurations of the two display panels were presented to subjects for short (2 second) and long (10 second) exposures in a partially counterbalanced design. For the short exposure, subjects were required to report the fuel tank being monitored, its amount, the total fuel amount, and any additional status information which could be detected. It was found that additional qualitatively different information could be provided on the electroluminescent display in a smaller panel area, providing display redundancy and a pictorial relatedness to aircraft status that could not be obtained with conventional displays. The test results indicated the electroluminescent display to be generally superior to the conventional panel in terms of both errors and performance times. Times required to report the tank being monitored, the tank amount, and the total fuel amount, were all significantly less when using the electroluminescent display, and overall, fewer errors occurred although this result was not obtained on all items for which errors were obtained. The results are discussed with respect to characteristics of information encodement in the two types of displays. (Author)
AD-655 690 HC$3.00 MF$0.65

MICROWAVE MONITORING OF SEA WATER CONTAMINATION OF NAVY FUEL OILS,
Naval Research Lab Washington D C
Dean D. Howard, Nathaniel A. Thomas, Michael C. Licitra, and Robert M. Roe. 21 Jun 67, 22p Rept no. NRL-6552

Descriptors: (*Fuel oil, Monitors), (*Monitors, Contamination), Sea water, Microwave equipment, Naval equipment, Dielectric properties, Measurement, Microwave frequency.

Studies of microwave monitoring techniques have resulted in a potential method of monitoring of the percentage of sea water contamination to an accuracy of 0.25%. Investigation was made of both the dielectric constant and the dissipation (microwave energy loss) characteristics of contaminated fuel. The dissipation measurement gave the greater accuracy which improved with increasing microwave frequency. The dissipation measured for all samples of uncontaminated fuels was very small compared to the sensitivity to water, so that the effects of the differences in the different sources of fuel were minimized. Testing of samples from all parts of the world with accurately mixed percentages of sea water showed that this microwave technique can be used to monitor the percentage of sea water to within 0.25% of the actual value regardless of the source of the oil. The ability to measure to this order of accuracy was limited, in part, by the difficulty of preparing sufficiently precise sample mixtures for testing the technique. The microwave technique also lends itself readily to convenient practical implementation of continuous monitoring of fuel flowing to the furnaces. (Author)
AD-655 819 HC$3.00 MF$0.65

COAL PROCESSING BY ELECTROFLUIDICS, PHASE II.
Iowa State Univ. of Science and Tech., Ames.
For primary bibliographic entry see Field 7A.
PB-174 927 HC$3.00 MF$0.65

COMBINED DESALINATION AND POWER GENERATION USING COAL ENERGY. PHASE II. INVESTIGATION OF EMERGING TECHNOLOGY, BY-PRODUCT RECOVERY, AND VERY LARGE CAPACITIES.
Kellogg (M. W.) Co., Piscataway, N. J. Research and Development Center.
For primary bibliographic entry see Field 7A.
PB-174 938 HC$3.00 MF$0.65

21E. Jet and Gas Turbine Engines

GAS TURBINE EJECTOR,
Foreign Technology Div Wright-Patterson AFB Ohio
P. A. Kogan, L. Ya. Klimov, Yu. A. Yushkin, and A. N. Yakushen. 27 Feb 67, 7p Rept no. FTD-HT-67-14
Unedited rough draft trans. of Patent (USSR) 166 246, appl. no. 866347/40-23 19 Nov 63.

Descriptors: (*Gas turbines, Turbine parts), (*Jet pumps, Patents), Gas turbine nozzles, Vapors, Refrigerants, Diffusers, Design, USSR.

The article discusses a gas turbine ejector for drawing off vapors of a refrigerant in systems of conditioning flying apparatuses which consists of an expansion nozzle and a diffusor. For the purpose of reducing size and weight, the mixing chamber and diffusor are designed in the form of ring-type slits profiled along the radius while the plane of symmetry of the expanding slit-type nozzle, which consists of two parts, is placed together with the plane of symmetry of the mixing chamber designed from two profiled plates.
AD-655 350 HC$3.00 MF$0.65

STRENGTH AND DYNAMICS OF AVIATION MOTORS: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
18 Apr 67, 117p Rept no. FTD-MT-65-520 TT-67-62363
Edited machine trans. of Prochnost i Dinamika Aviatsionnykh Dvigatelei; Sbornik Statei (USSR) n1 p175-276 1964.

Descriptors: (*Compressor blades, Oscillation), USSR, Aircraft engines, Axial-flow compressor blades, Flutter, Vibration, Angle of attack, Force (Mechanics).

Contents: Analysis of conditions of appearance of natural oscillations of a system with one degree of freedom; Curving-twisting oscillations of twisted compressor blades; Conditions of activation of stall flutter of compressor blades.
AD-655 382 HC$3.00 MF$0.65

EXTERNAL BURNING RAMJETS PRELIMINARY FEASIBILITY STUDY.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
G. L. Dugger, and L. Monchick. Mar 67, 93p Rept no. TG-892
Contract NOw-62-0604

Descriptors: (*Ramjet engines, *External combustion engines), Feasibility studies, Flames, Airfoils, Jet propulsion, Nozzles, Cooling, Thrust.

Experiments and analyses have shown that burning beneath external surfaces of a supersonic vehicle can produce lift and reduce drag. Preliminary analyses of some two-dimensional external burning ramjet (ERJ) and external expansion ramjet (EERJ) models yield some encouraging results. The EERJ uses ducted subsonic combustion but all-external expansion, so that the two-dimensional (or half-round) nozzle obtains some heat relief by radiation and contributes to vehicle lift, increasing lift/drag ratio. Effects of vectoring the EERJ nozzle and advantages and disadvantages of substituting a simple ramp in place of the nonreflecting surface are explored briefly. Three possible paths for the design of hypersonic transport vehicles incorporating EERJ's for cruise power and auxiliary lower speed engines are pictured and discussed in general terms. (Author)
AD-655 459 HC$3.00 MF$0.65

EXTERNAL BURNING IN SUPERSONIC STREAMS.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
F. S. Billig. May 67, 132p Rept no. TG-912
Contract NOw-62-0604

Descriptors: (*External combustion engines, Supersonic combustion), (*Ramjet engines, External combustion engines), Thrust, Attitude control systems, Heat, Mathematical models, Wedges, Flat plate models, Flow fields.

Theoretical and experimental studies of heat addition to external supersonic streams are reviewed, following a brief explanation of the basic fluid mechanical model and possible applications of external burning. Previously developed methods and a new, simplified method for obtaining linearized heat addition solutions are presented. The numerous analyses of combustion via a stationary detonation wave are categorized into four models for planar heat addition, and the equations are developed for the most interesting case of the oblique Chapman-Jouget detonation. The governing equations for a constant-pressure analysis are developed, and performance estimates are given for heat addition adjacent to both double-wedge and flat-plate surfaces. Experimental results of all available external burning tests are discussed, including tests of two-dimensional and axisymmetric bodies. Data are compiled, summarized, and analyzed. The maximum expected pressure coefficient will be near that associated with a separated boundary layer. To obtain the theoretical maximum specific impulse, highly reactive fuels with a combustion length of a few feet will be required. (Author)
AD-655 460 HC$3.00 MF$0.65

CONDENSATION OF SUPERSATURATED ORGANIC VAPORS IN A SUPERSONIC NOZZLE,
Massachusetts Inst of Tech Cambridge Gas Turbine Lab
For primary bibliographic entry see Field 20D.
AD-655 473 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF ADVANCED CONCEPTS TO INCREASE TURBINE BLADE LOADING. I - ANALYSIS AND DESIGN.
General Motors Corp., Indianapolis, Ind. Allison Div.
H. G. Lueders. Jun 67, 157p NASA-CR-735, ERD-4909
Contract NAS3-7902

Descriptors: *Aerodynamic load, *Boundary layer control, *Jet flap, *Rotor blade, Aerodynamic, Airfoil, Blade, Blowing, Boundary, Control, Flap, Flow, Generator, Jet, Layer, Load, Rotor, Separation, Slot, Stator, Tandem, Tangent, Turbine, Velocity, Vortex.

For abstract, see STAR 05 17.
N67-31216 HC$3.00 MF$0.65

COLLATION OF POWER PLANT STUDIES.
IIT Research Inst., Chicago, Ill.
For primary bibliographic entry see Field 13J.,
PB-175 612 HC$3.00 MF$0.65

21F. Nuclear Propulsion

ATOMIC ENERGY IN AVIATION AND ROCKET TECHNOLOGY: COLLECTION OF ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 15F.
AD-655 596 HC$3.00 MF$0.65

21G. Reciprocating Engines

COLLATION OF POWER PLANT STUDIES.
IIT Research Inst., Chicago, Ill.
For primary bibliographic entry see Field 13J.
PB-175 612 HC$3.00 MF$0.65

21H. Rocket Motors and Engines

FLAME-PILOTING MECHANISMS IN LIQUID PROPELLANT ROCKET ENGINES.
Scientific rept.,
Little (Arthur D) Inc Cambridge Mass
Aubrey C. Tobey, and E. Karl Bastress. Oct 66, 73p Rept no. ADL-64601-S
AFOSR-67-0938
Contract AF 49 (638)-1120

Descriptors: (*Rocket motors (Liquid propellant), Flames), (*Flames, Stability), Combustion, Liquid rocket propellants, Gaseous rocket propellants, Performance (Engineering), Injectors, Combustion chambers.

A program was directed toward the systematic investigation of flame-piloting mechanisms in liquid rocket engines and their role in combustion instability. The mechanism which gained the most attention was recirculation. The program included experimental analysis of rocket engine performance as affected by external disturbances, minor geometry changes, and propellant state changes; and theoretical analysis of mixing in chemically reacting systems. Principal conclusions drawn from the results of the program are: (1) Characteristics of the injector and of the propellants are principal factors in the chemical kinetics and fluid dynamics within rocket engine combustors. (2) For the rocket engine and perturbation technique used, engine stability is unaffected by perturbations of the recirculation zone. This does not necessarily eliminate the process of recirculation as a factor in engine stability. (Author)
AD-655 792 HC$3.00 MF$0.65

TWO-HUNDRED SIXTY-IN.-DIA MOTOR FEASIBILITY DEMONSTRATION PROGRAM. VOLUME VI - 260-SL MOTOR NOZZLE AND EXIT CONE ASSEMBLIES. BOOK 1 - TEXT FINAL PHASE REPORT.
Aerojet-general Corp., Sacramento, Calif.
8 Apr 66, 241p NASA-CR-72125
Contract NAS3-6284

Descriptors: *Ablating material, *Manufacturing, *Structural design, Ablation, Cone, Control, Design, Evaluation, Exit, Fabrication, Firing, Large, Material, Motor, Nozzle, Program, Quality, Rocket, Rocket nozzle, Structural, Test.

For abstract, see STAR 05 17.
N67-31200 HC$3.00 MF$0.65

SURFACE INSTABILITY AND DISINTEGRATION OF LIQUID IN A LONGITUDINALLY EXCITED CONTAINER.
Southwest Research Inst., San Antonio, Tex. Dept. of Mechanical Sciences.
C. R. Gerlach. 15 Mar 67, 77p NASA-CR-85899, TR-9
Contract NAS8-11045

Descriptors: *Cylindrical tank, *High frequency, *Liquid surface, *Longitudinal stability, Cylinder, Disintegration, Effect, Excitation, Frequency, High, Instability, Interface, Liquid, Longitudinal, Low gravity, Mode, Propellant, Random, Response, Space, Spray, Stability, Surface, Tank, Vapor, Vehicle, Vibration.

For abstract, see STAR 05 17.
N67-31361 HC$3.00 MF$0.65

PERFORMANCE OF STUDIES TO DETERMINE THE FEASIBILITY OF VARIOUS TECHNIQUES FOR MEASURING PROPELLANT MASS ABOARD ORBITING SPACE VEHICLE FINAL REPORT.
Industrial Nucleonics Corp., Columbus, Ohio. Federal Systems Div.
13 Apr 67, 165p NASA-CR-85790
Contract NAS8-21014

Descriptors: *Fuel gauge, *Gamma radiation, *Liquid propellant, *Propellant tank, Backscatter, Detector, Fuel, Gamma, Gauge, Liquid, Mass, Measurement, Orbital, Propellant, Radiation, Shadow, Source, Spacecraft, Tank, Technique, Transmission, X-ray.

For abstract, see STAR 05 17.
N67-31403 HC$3.00 MF$0.65

PERFORMANCE OF X 258 THIRD-STAGE MOTOR ON DELTA 36 (OT-3).
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. E. Schmidt. Jul 67, 32p NASA-TN-D-4050
Contract 492-05-00-01-51

Descriptors: *Delta launch vehicle, *In-flight monitoring, *Performance characteristics, *Solid propellant rocket engine, *Third stage, Burnout, Characteristics, Impulse, In-flight, Launch vehicle, Monitor, Performance, Pressure, Propellant, Rocket engine, Solid, Spin, Stage, Telemetry, Temperature, Third, Time, Velocity.

For abstract, see STAR 05 17.
N67-31409 HC$3.00 MF$0.65

M-1 ENGINE SUBSCALE INJECTOR TESTS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
H. E. Bloomer, A. H. Mansour, and H. E. Scott. Jul 67, 30p NASA-TN-D-4053

Descriptors: *Chugging, *Injector, *M- 1 rocket engine, *Performance characteristics, *Stability test, Characteristics, Efficiency, Flow, Frequency, Hydrogen, Oxygen, Performance, Pressure, Stability, Subscale, Temperature, Test.

For abstract, see STAR 05 17.
N67-31442 HC$3.00 MF$0.65

21I. Rocket Propellants

FINITE ELEMENT ANALYSIS OF AXISYMMETRIC SOLIDS WITH ARBITRARY LOADINGS,
California Univ, Berkeley Structural Engineering Lab
For primary bibliographic entry see Field 20K.
AD-655 253 HC$3.00 MF$0.65

DYNAMIC INSTABILITY OF CIRCULAR, CYLINDRICAL-SHELLS HAVING VISCOELASTIC CORES.
Polytechnic Inst of Brooklyn N Y
For primary bibliographic entry see Field 20K.
AD-655 306 Not available from CFSTI.

SAFETY PROCEDURES FOR HIGH ENERGY FUELS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 13L.
AD-655 423 HC$3.00 MF$0.65

MECHANICAL PROPERTIES OF HIGHLY FILLED ELASTOMERS VI. INFLUENCE OF FILLER CONTENT AND TEMPERATURE ON ULTIMATE TENSILE PROPERTIES.
Technical rept.,
Central Laboratory T N O Delft (Netherlands)
C. J. Nederveen, and H. W. Bree. May 67, 46p
Rept no. TR-6, CL-67/34
Contract N62558-4375

Descriptors: (*Rocket propellant grains, Models (Simulations)), (*Elastomers, Tensile properties), Isocyanate plastics, Additives, Sodium chloride, Stresses, Strain (Mechanics), Thermal properties, Rupture, Elongation, Composite propellants.

Results are presented of stress-strain tests performed at various temperatures and strain rates on materials filled with various amounts of sodium chloride particles with a mean size of 0.1 mm. Stress and strain at rupture decreased with increasing filler content. For each material investigated it was possible to construct the well-known failure envelope by means of which the results could be described adequately. The dewetting of the particles in the rubbery matrix, sometimes resulting in a maximum in the stress-strain curve, is ascribed to failure of the rubber between the particles and not to failure of the rubber-salt bond, because the dewetting maximum was dependent on temperature and time in the same way as the rupture properties of the unfilled material. The results are compared with earlier investigations, e.g. high speed tensile tests and creep experiments, and a good agreement is found. (Author)
AD-655 634 HC$3.00 MF$0.65

SOLID PROPELLANT IGNITION BY CONVECTIVE HEATING.
Final rept.,
Little (Arthur D) Inc Cambridge Mass
E. Karl Bastress, and Walter R. Niessen. Oct 66, 51p Rept no. ADL-C-64601-1
AFOSR-67-0932
Contract AF 49 (638)-1120

Descriptors: (*Solid rocket propellants, *Ignition), (*Composite propellants, Ignition), Convection (Heat transfer), Gas flow, Solid rocket oxidizers, Decomposition, Test equipment, Heat transfer.

The objective of the study was to determine the effects of gas flow characteristics on solid propellant ignition behavior under convective heating. Ignition tests of three composite propellants were conducted in a hot-gas tunnel designed for convective heating experiments. Effects of gas velocity, test chamber configuration, and approach surface material on ignition were observed. It is concluded that ignition is initiated in the gas phase and is influenced by the local temperature and the local concentration of oxidizer decomposition products from upstream portions of the propellant surface. Either temperature or oxidizer concentration may control the time of ignition. When oxidizer concentration is controlling, the test configuration and gas velocity are important parameters. When temperature is controlling, ignition time can be correlated with heating rate alone. However, long propellant samples must be used to obtain meaningful data. Ignition times measured with long propellant

samples are considerably lower than those measured with small samples. (Author)
AD-655 793 HC$3.00 MF$0.65

A STUDY OF HYDROGEN SLUSH AND/OR HYDROGEN GEL UTILIZATION. VOLUME II - SYSTEMS OPTIMIZATION AND VEHICLE APPLICATION STUDIES FINAL REPORT.
Lockheed Missiles and Space Co., Sunnyvale, Calif.
11 Mar 67, 236p NASA-CR-85822, K-11-67-1
Contract NAS8-20342

Descriptors: *Gel, *Hydrogen fuel, *Slush, *Subcooling, Application, Fuel, Hydrogen, Liquid, Optimization, Rocket, Space, System, Technology, Vehicle.

For abstract, see STAR 05 17.
N67-31330 HC$3.00 MF$0.65

22. SPACE TECHNOLOGY

22A. Astronautics

ANALYSIS OF TIME-DELAY MAGNETIC DAMPING OF SPACECRAFT LIBRATIONS IN NEAR-SYNCHRONOUS EQUATORIAL ORBITS.
Technical memorandum,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
D. L. Mackison. Jun 67, 51p Rept no. TG-916
Contract NOw-62-0604

Descriptors: (*Time-lag theory, *Mathematical models), (*Earth (Planet), Magnetic fields), Hysteresis, Spacecraft, Rotation, Differential equations, Motion, Momentum, Dipole moments, Damping, Oscillation, Satellite attitude.

Time-lag magnetic damping provides a method of using the earth's magnetic field for rapid libration damping of satellites when the field strength is insufficient to dissipate energy with magnetic hysteresis material. This consists of generating a spacecraft-fixed magnetic dipole, initially parallel to the earth's magnetic field, and holding it constant as the spacecraft librates. When the magnet is turned off, a portion of the satellite's angular momentum has been transferred to the earth's magnetic field. A mathematical model is developed relating the dipole moment, the dipole holding time, and the initial attitude to the energy dissipation rate. Comparisons are made between the results predicted analytically by the damping model and those obtained by numerical integration of the differential equations of attitude motion. (Author)
AD-655 425 HC$3.00 MF$0.65

SPACE PROGRAMS SUMMARY NO. 37-45, VOLUME III FOR THE PERIOD MARCH 1 TO APRIL 30, 1967. THE DEEP SPACE NETWORK.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
For primary bibliographic entry see Field 17G.
For abstract, see STAR 05 17.
N67-30371 HC$3.00 MF$0.65

FROM OUTER SPACE BY PARACHUTE.
Volt Technical Corp., Washington, D. C.
For primary bibliographic entry see Field 5J.
For abstract, see STAR 05 17.
N67-30622 HC$3.00 MF$0.65

PLANETARY QUARANTINE PROGRAM QUARTERLY PROGRESS REPORT, PERIOD ENDING 30 JUN. 1967.
Sandia Corp., Albuquerque, N. Mex.
For primary bibliographic entry see Field 6M.
For abstract, see STAR 05 17.
N67-30747 HC$3.00 MF$0.65

DIGEST REPORT - MISSIONS TO THE OUTER PLANETS.
IIT Research Inst., Chicago, Ill. Astro Sciences Center.
F. Narin. May 67, 33p NASA-CR-85770, M-14
Contract NASR-65/06/

Descriptors: *Flyby mission, *Interplanetary flight, *Planetary orbit, Ballistics, Flight, Flyby, Interplanetary, Mission, Neptune, Orbit, Outer, Planet, Planetary, Planning, Pluto, Review, Saturn, Space flight, Summary, Uranus.

For abstract, see STAR 05 17.
N67-30917 HC$3.00 MF$0.65

A STUDY OF DECISION REGION RECEIVERS FOR THE SUNBLAZER SPACE EXPERIMENT.
Massachusetts Inst. of Tech., Cambridge. Center for Space Research.
For primary bibliographic entry see Field 17B.
For abstract, see STAR 05 17.
N67-30950 HC$3.00 MF$0.65

POLAR MAGNETIC DISTURBANCES AND THE INTERPLANETARY MAGNETIC FIELD.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
D. H. Fairfield. Jul 67, 29p NASA-TM-X-55836, X-612-67-338

Descriptors: *Geomagnetic effect, *Imp, *Interplanetary magnetic field, Aurora, Current, Disturbance, Effect, Field, Geomagnetic, High latitude, Interplanetary, Magnetic, Magnetosphere, Measurement, Plasma, Production, Solar, Wind, Zone.

For abstract, see STAR 05 17.
N67-31359 HC$3.00 MF$0.65

RECORD OF AGARD LECTURE SERIES.
Advisory Group for Aerospace Research and Development, Paris (France).
J. C. Dunne, and A. G. Vannucci. 1966, 63p
Its Lecture Ser. I To Xxiii

Descriptors: *Abstract, *Astronautics, *Fluid mechanics, *Operations research, *Space navigation, *Spacecraft propulsion, Aerodynamics, Bionics, Communication, Control, Electronics, Fluidics, Guidance, Missile, Navigation, Operation, Propulsion, Research, Rocket, Satellite, Space, Spacecraft.

For abstract, see STAR 05 17.
N67-31404 HC$3.00 MF$0.65

22B. Spacecraft

SECONDARY ELECTRON EMISSION FROM SATELLITE SURFACES,
General Dynamics/Convair, San Diego, Calif.
D. B. Medved. 17 Mar 61, 39p ZPH-084
Contract AF 19 (604)-5554

Descriptors: (*Satellites (Artificial), *Scattering), (*Secondary emission, *Surfaces), Density, Electromagnetic waves, Electrons, Gas ionization, Magnetohydrodynamics, Partial differential equations, Plasma physics, Space charges.
Identifiers: Defender project.

The relevance of secondary electron emission to the charge accumulation and production of electron sheaths around satellites is reviewed as a function of altitude and ambient conditions. It is found that for values of lambda greater than 0.0001, secondary electron emission can make an important contribution to these processes for altitudes below 250 km. Here lambda is the coefficient of secondary electron emission in terms of electrons emitted per incident neutral particle. If photoelectric processes are considered, then for quantum yields greater than 0.01 and photon fluxes greater than 1 microwatt sq. cm, satellite surface charge will go positive in an ambient ionized medium where the electron density is less than 1000. This corresponds to altitudes greater than 1000 km. (Author)
AD-274 799 HC$3.00

ORBITAL BASING: KEY TO LOW COST SPACE OPERATIONS,
Rand Corp Santa Monica Calif
G. A. Sears. Jul 67, 25p Rept no. P-3570

Descriptors: (*Space stations, Costs), Manned, Recovery, Life expectancy, Traffic, Launching, Operation, Weight.

A comparison is made of some of the operational and cost-influencing characteristics of low-orbit space operations conducted from a manned orbital base and from an earth base. The earth-based mode of operation is that employed today, whereby expendable spacecraft are placed in mission orbits with expendable launch vehicles. In the orbital-basing concept the spacecraft are based at a manned space station, are injected into their mission orbits as required, and subsequently rendezvous with the space station for rejuvenation and reuse. Reuse has long been considered the key to lowering the very high cost of space operations; however, most reuse concepts studied in depth have involved recovery to earth of launch vehicles and/or spacecraft. The reasons why development of reusable systems has not been initiated are many, prominent among which are these: (1) Very significant weight penalties are associated with recovery gear, particularly orbital recovery gear; (2) refurbishment costs and useful life of recovered vehicles are difficult to appraise; and (3) traffic rates are not foreseen which are adequate to amortize R and D costs of billions of dollars over a reasonable time period. These problems are all associated with recovery, however, and can be avoided by reuse of equipment on orbit. (Author)
AD-655 342 HC$3.00 MF$0.65

COMPUTERIZED CLIMATOLOGY VS. SATELLITE RECONNAISSANCE IN A MINIMUM CLOUD AREA,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 4B.
AD-655 347 HC$3.00 MF$0.65

SUBCRITICAL LIQUID OXYGEN STORAGE AND SUPPLY SYSTEM FOR USE IN WEIGHTLESS ENVIRONMENTS.
Final rept. 1 Jan 64-3 May 66,
Bendix Corp Davenport Iowa Pioneer-Central Div
H. Robert Lundeen. Apr 67, 70p
AMRL-TR-66-178
Contract AF 33 (615)-2308

Descriptors: (*Liquefied gases, *Oxygen), (*Spacecraft, Oxygen), Weightlessness, Life support, Space environmental conditions, Temperature, Pressure, Acceleration, Storage tanks, Nitrogen, Breathing apparatus, Physical properties, Weight, Tables, Design.

A subcritical liquid oxygen storage and supply system for use in weightless environments was designed, combining the properties of the capillary-wick to displace gas phase from a two-phase mixture, thus assuring liquid phase delivery, with the dominant surface tension forces which cause liquid phase to accumulate at the periphery and gas phase to locate at the center of a spherical container in a weightless environment. A 10-liter prototype unit was fabricated based on these concepts. The complete system includes, in addition to the storage container, associated temperature, pressure, acceleration, and strain sensors to monitor system performance in weightless conditions. Liquid phase delivery from the pressure vessel has been demonstrated by the oxygen-nitrogen mixed

gas test technique. The testing program conducted on the prototype unit gave every indication that the design concept is satisfactory for weightless operation. (Author)
AD-655 359 HC$3.00 MF$0.65

RADIATION BELTS OF THE EARTH USING SOVIET EARTH SATELLITE AND COSMIC ROCKETS 1957-1959,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 4A.
AD-655 364 HC$3.00 MF$0.65

SPACE AND THE PROBLEM OF UNIVERSAL PEACE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 5D.
AD-655 366 HC$3.00 MF$0.65

APPLICATION OF GROUND TEST DATA TO REENTRY VEHICLE DESIGN.
Final rept. Jun 65-Dec 66,
Boeing Co Seattle Wash
Alfred C. Thomas, and Andrew Perlbachs. Jan 67, 138p
AFFDL-TR-66-229
Contract AF 33 (615)-2516

Descriptors: (*Reentry vehicles, Design), Experimental data, Thermodynamics, Delta wings, Surface roughness, Aerodynamic control surfaces, Simulators, Flow fields.

Methods and procedures were developed for extrapolating ground-test aerothermodynamic data to flight conditions for four geometric elements. These elements are a sharp unyawed delta wing, deflected control surfaces in compression and expansion, surface roughness elements typified by shallow convex surface waves and rectangular grooves, and a yawed circular cylinder intersecting a sharp flat plate. Graphs and charts are provided for rapid numerical computation of factors to be used in extrapolating the wind-tunnel data for these geometric elements to flight conditions. An evaluation of the simulation capabilities of operational hypersonic ground facilities is also included. (Author)
AD-655 383 HC$3.00 MF$0.65

AURORAL ZONE IONOSPHERIC RESEARCH.
Kiruna Geophysical Observatory (Sweden)
For primary bibliographic entry see Field 4A.
AD-655 393 HC$3.00 MF$0.65

STABILIZATION SYSTEM ANALYSIS AND PERFORMANCE OF THE GEOS-A GRAVITY-GRADIENT SATELLITE (EXPLORER XXIX).
Technical memorandum,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
V. L. Pisacane, P. P. Pardoe, and B. J. Hook. Mar 67, 20p Rept no. TG-901
Contract NOw-62-0604

Descriptors: (*Scientific satellites, Stabilization systems), (*Orbital trajectories, Scientific satellites), Performance (Engineering), Altimeters, Equations of motion, Analysis.
Identifiers: Explorer.

The paper discusses the stabilization system analysis and orbital performance of the GEOS-A gravity-gradient satellite which was launched into orbit on 6 November 1965. The analysis is performed with the aid of a rather general digital simulation of the non-linear differential equations of motion. It includes the effects of gravity-gradient forces, orbital eccentricity, eddy current dampers, residual magnetic dipoles, solar radiation pressure, and thermal distortion of the spacecraft's stabilization boom. The attitude measuring system aboard the spacecraft is described, and processing of the attitude data is discussed. Description of failures in the attitude determination system and discussion of the subsequent effects on the experimental attitude results are included. Experimental attitude results are compared with the results of the digital simulation. General agreement is obtained. (Author)
AD-655 645 HC$3.00 MF$0.65

AN EXPERIMENT WITH THE CONSTRUCTION OF A GEOMAGNETIC MAP FROM DATA OF AN ARTIFICIAL EARTH SATELLITE.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8B.
AD-655 702 HC$3.00 MF$0.65

MATHEMATICAL/STATISTICAL TECHNIQUE TO ESTIMATE MAXIMUM AEROSPACE VEHICLE RESPONSE TO WIND.
Final rept., 23 Jun 65-31 May 67,
Kaman Nuclear Colorado Springs Colo
C. Eugene Buell. 31 May 67, 215p Rept no. KN-67-663 (FR)
AFCRL-67-0394
Contract AF 19 (628)-5170

Descriptors: (*Aerospace craft, Aeroelasticity), Wind, Response, Statistical distributions, Moments, Bending, Design.

The statistical distribution of the maximum (per flight) resultant bending moment of an aerospace vehicle can be acquired in a 'brute-force' manner from calculations of level-by-level bending moments during computer-simulated launchings through a representative sample of individual wind soundings. This distribution resembles, closely, the 'Gumbel' distribution. Calculated risk design philosophy in which the probability of failure is specified can be applied to this distribution to arrive at a final design configuration. To avoid extensive computer efforts required by this 'brute-force' approach, the statistics of wind, interlevel covariances of and between wind components and wind shear components are used in connection with dynamical equations to compute the statistics of bending moment response in a single computer run. The parameters determined from these statistics for the distribution of maximum resulting bending moment per flight agree closely with those determined from the individual wind sounding method. Several other methods of treating the problem are discussed in view of simplification for the work and shortening the computations. (Author)
AD-655 809 HC$3.00 MF$0.65

HEAT-TRANSFER MEASUREMENTS ON THE ROTOR BLADE OF A ROTOR ENTRY VEHICLE MODEL.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 17.
N67-30684 HC$3.00 MF$0.65

TELECOMMUNICATIONS SATELLITES.
Satellites de Telecommunications
Institut D Aeronomie Spatiale de Belgique, Brussels.
E. Aerts, and P. Ville. 1967, 58p
in French, English Summary Presented At the B.R.T. Meeting, 28 Mar. 1967 Its Aeronomica Acta F-9-1967

Descriptors: *Communications satellite, *Europe, *Telecommunication, *U.S.S.R., *United states, Applications technology satellite (ats), Communications, Early bird satellite, Echo satellite, Intelsat satellite, Lincoln experimental satellite (les), Military, Relay satellite, Satellite, Synchronous communications (syncom) satellite, Telstar satellite, West ford project.

For abstract, see STAR 05 17.
N67-30733 HC$3.00 MF$0.65

ANALYSIS AND DESIGN OF SPACE VEHICLE FLIGHT CONTROL SYSTEMS. VOLUME XI - COMPONENT DYNAMICS.
General Dynamics/Convair, San Diego, Calif.
J. G. Collette. Jul 67, 92p NASA-CR-830, GDC-DDE66-031
Contract NAS8-11494

Descriptors: *Actuator, *Flight control, *Sensing, *Signal processing, Accelerometer, Attitude, Control, Electric, Flight, Guidance, Gyroscope, Hydraulic, Navigation, Platform, Power, Processing, Signal.

For abstract, see STAR 05 17.
N67-30769 HC$3.00 MF$0.65

FIRST AND SECOND SIMULATOR EVALUATIONS OF ADVANCED INTEGRATED DISPLAY AND CONTROL SYSTEMS.
Ling-temco-vought, Inc., Dallas, Tex.
J. E. Burke, R. D. Huchingson, R. J. Koppa, and H. E. Sewell, Jr.. Jun 67, 197p NASA-CR-762
Contract NASW-611

Descriptors: *Control system, *Display system, *Manned spacecraft, Analog, Control, Display, Flight, Horizontal, Maneuver, Manned, Orbit, Path, Simulator, Spacecraft, System, Velocity, Vertical.

For abstract, see STAR 05 17.
N67-30804 HC$3.00 MF$0.65

PRELIMINARY DESIGN STUDY OF SLAMAST SCOUT- LAUNCHED ADVANCED MATERIALS AND STRUCTURES TEST-BED. VOLUME II - DESIGN FEASIBILITY.
General Electric Co., Philadelphia, Pa. Missiles and Space Div.
14 Apr 67, 243p NASA-CR-66398
Contract NAS1-7014

Descriptors: *Lifting reentry, *Recoverable space vehicle, *Reentry vehicle, *Test bed, Aerodynamics, Bed, Communication, Design, Dynamics, Feasibility, Flight, Lifting, Recovery, Reentry, Scout launch vehicle, Space, Test, Thermodynamics, Thermostructure, Vehicle.

For abstract, see STAR 05 17.
N67-31097 HC$3.00 MF$0.65

SURVEYOR SPACECRAFT SYSTEM. VOLUME I - FINAL STERILIZATION REPORT, APR. 1961 - MAR. 1963.
Hughes Aircraft Co., Culver City, Calif. Space Systems Div.
L. Manning, R. J. Varga, and M. Willard. Jun 63, 121p NASA-CR-85872, SSD-3372R, VOL. I
Contract JPL-950056

Descriptors: *Chemical sterilization, *Heating, *Spacecraft sterilization, *Surveyor spacecraft, Chemical, Compatibility, Component, Ethylene, Freon 12, Liquid, Material, Operation, Oxide, Planning, Procedure, Requirement, Spacecraft, Sterilant, Sterilization, Technique.

For abstract, see STAR 05 17.
N67-31115 HC$3.00 MF$0.65

COSMIC RAY EXPERIMENTS (ELEMENTARY PARTICLE PHYSICS) IN A MANNED ORBITING LABORATORY.
Minnesota Univ., Minneapolis.
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 17.
N67-31163 HC$3.00 MF$0.65

PRELIMINARY DESIGN STUDY OF SLAMAST SCOUT- LAUNCHED ADVANCED MATERIALS AND STRUCTURES TEST-BED. VOLUME III - SUMMARY.
General Electric Co., Philadelphia, Pa. Missile and Space Div.
14 Apr 67, 45p NASA-CR-66399
Contract NAS1-7014

Descriptors: * Hl-10 reentry vehicle, * Lifting reentry, * Recoverable space vehicle, * Scout launch vehicle, * Test bed, Design, Experiment, Feasibility, Lifting, Material, Program, Recovery, Reentry, Structure, Subscale, Test, Vehicle.

For abstract, see STAR 05 17.
N67-31235 HC$3.00 MF$0.65

A SURVEY OF ATTITUDE SENSORS FOR SPACECRAFT.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va. N. M. Hatcher. 1967, 21p NASA-SP-145

Descriptors: * Attitude indicator, * Horizon scanner, * Map-matching guidance, * Solar sensor, * Spacecraft sensor, * Star tracker, Attitude, Cone, Design, Generator, Guidance, Horizon, Indicator, Magnetic, Map, Matching, Operation, Planar, Pulse, Scanner, Sensor, Sextant, Solar, Space, Spacecraft, Star, Tracker.

For abstract, see STAR 05 17.
N67-31296 HC$3.00 MF$0.65

ANALYSIS OF THE TRAJECTORY, LOADS AND HEATING EXPERIENCED BY A BODY PASSING THROUGH A SUPERSONIC FLOW FIELD.
Lockheed Missiles and Space Co., Huntsville, Ala. Huntsville Research and Engineering Center.
H. W. Butler, and R. J. Prozan. Mar 67, 88p
NASA-CR-84855, HREC-1567-1
Contracts NAS7-100, JPL-951567
Prepared for Jpl

Descriptors: * Aerodynamic load, * Heat effect, * Rocket exhaust, * Trajectory analysis, Aerodynamic, Analysis, Body, Continuum, Effect, Equilibrium, Exhaust, Field, Heat, Load, Pressure, Regime, Rocket, Shape, Spacecraft, Stagnation, Thermochemistry, Trajectory, Transition, Unsymmetrical.

For abstract, see STAR 05 17.
N67-31352 HC$3.00 MF$0.65

PRELIMINARY DESIGN STUDY OF SLAMAST SCOUT- LAUNCHED ADVANCED MATERIALS AND STRUCTURES TEST-BED. VOLUME I - EXPERIMENT FEASIBILITY.
General Electric Co., Philadelphia, Pa. Missile and Space Div.
14 Apr 67, 104p NASA-CR-66397
Contract NAS1-7014

Descriptors: * Lifting reentry, * Material testing, * Reentry vehicle, * Test bed, * Thermostructure, Bed, Experiment, Feasibility, Hl-10 reentry vehicle, Lifting, Material, Panel, Reentry, Scout launch vehicle, Simulation, Test, Testing, Vehicle.

For abstract, see STAR 05 17.
N67-31444 HC$3.00 MF$0.65

22C. Spacecraft Trajectories and Reentry

A CLASS OF E. STROEMGREN'S DIRECT ORBITS IN THE RESTRICTED PROBLEM,
Yale Univ New Haven Conn Observatory
Victor Szebehely, and Paul Nacozy. 21 Nov 66, 9p
AFOSR-67-1603
Grant AF-AFOSR-397-67
Availability: Published in Astronomical Journal v72 n2 p184-90 Mar 1967.

Descriptors: (* N-body problem, * Orbital trajectories), Stability, Equations of motion, Periodic variations, Mathematical analysis, Equilibrium.

A family of periodic orbits in the restricted problem of three bodies is investigated. Members of this class are generated from circular direct orbits of infinitesimal radius around one of the primaries. The development of the entire class is shown between the two terminating orbits. The class begins at one of the primaries and ends as the combination of two asymptotic periodic orbits spiraling into the triangular equilibrium points. In Elis Stromgren's terminology these orbits form class g of the Copenhagen problem. His conjecture regarding the termination of the family is shown to have been correct. (Author)
AD-655 334 Not available from CFSTI.

STABILIZATION SYSTEM ANALYSIS AND PERFORMANCE OF THE GEOS-A GRAVITY-GRADIENT SATELLITE (EXPLORER XXIX).
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 22B.
AD-655 645 HC$3.00 MF$0.65

GROUND TEST FACILITIES FOR AEROTHERMODYNAMIC SIMULATION OF BALLISTIC REENTRY VEHICLE NOSE-TIP CONDITIONS,
Aerospace Corp El Segundo Calif Labs Div
William E. Welsh, Jr. May 67, 40p Rept no. TR-1001 (2240-10)-6
SSD-TR-67-105
Contract AF 04 (695)-1001

Descriptors: (* Reentry vehicles, * Atmosphere entry), (* Nose cones, * Ablation), Simulators, Test facilities, Aerodynamic heating, Shear stresses, Ballistics, Trajectories, Thermodynamics.
Identifiers: Ablative materials.

A study was made of ground test simulation of flight conditions of high performance ballistic reentry vehicles, as performed for assessment of ablation performance of nose-tip materials. The study utilized a generalized representation of vehicle materials, configurations, and trajectories. Existing high-temperature steady-flow test facilities were found to be adequate for simulation of peak heating, shear, and pressures corresponding to those for a vehicle reentering the atmosphere at 25,000 ft/sec, at an angle of 30 deg, with a ballistic coefficient of about 800. Improved test facility conditions are required for reentry vehicles of ballistic coefficients higher than 800. The corresponding power, pressure, and enthalpy requirements are shown for arbitrary values of ballistic parameters. Possible advanced facilities for the achievement of higher pressure, enthalpy, and heating rate are compared and briefly discussed. Among these are: a higher-powered heated-flow test facility, a ballistic range test facility, a thermal-radiation augmentation method, and improvements in existing heated-flow facilities. (Author)
AD-655 784 HC$3.00 MF$0.65

ERROR ESTIMATE IN PREDICTIONS OF ORBITAL ANGLES.
Revised ed.,
Duke Univ Durham N C Special Research in Numerical Analysis Group
F. J. Murray. 19 Jul 67, 198p
Contract DA-31-124-ARO (D)-13
Revision of manuscript submitted 10 Jan 64.

Descriptors: (* Satellites (Artificial), * Orbital trajectories), Equations of motion, Computer programs, Flow charting, Numerical analysis, Predictions, Errors, Tracking.

This report analyzes the capabilities of angles-only input data for satellite orbital predictions by Satellite Communications Control Center (SCCC) using U. S. Army Satellite Communications Agency ground stations. To be more precise, the problem is to determine how far in advance one can predict the elevation, azimuth, and time of a satellite to an accuracy within the limitations of a satellite tracking station by measuring the elevation, azimuth, and time during one pass and calculating the future orbits.
AD-655 833 HC$3.00 MF$0.65

CHARACTERISTICS OF THE SUBTROPICAL JET STREAM OF THE N.W. OF AFRICA.
France. Direction de La Meteorologie Nationale, Paris.
For primary bibliographic entry see Field 4B.
For abstract, see STAR 05 17.
N67-30646 HC$3.00 MF$0.65

THE UTILIZATION OF AN IMPULSIVE SOLUTION IN SOLVING OPTIMUM TRAJECTORY PROBLEMS WITH BOUNDED THRUST MAGNITUDE.
National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
D. J. Jezewski. Jul 67, 30p NASA-TN-D-4059

Descriptors: * Thrust power, * Trajectory optimization, * Variational calculus, Acceleration, Calculus, Convergence, Equation, Lagrange multiplier, Magnitude, Motion, Multiplier, Optimization, Thrust, Trajectory, Vacuum, Variation.

For abstract, see STAR 05 17.
N67-30682 HC$3.00 MF$0.65

PROBABILITY OF RECORDING SATELLITE IMAGES OPTICALLY.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
For primary bibliographic entry see Field 14E.
For abstract, see STAR 05 17.
N67-30884 HC$3.00 MF$0.65

THRUST-LIFT INTEGRATION AND ITS CONSEQUENCES ON THE ECONOMY OF ATMOSPHERIC FLIGHT AT HIGH SPEED.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 21A.
For abstract, see STAR 05 17.
N67-30909 HC$3.00 MF$0.65

DIGEST REPORT - MISSIONS TO THE OUTER PLANETS.
IIT Research Inst., Chicago, Ill. Astro Sciences Center.
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 17.
N67-30917 HC$3.00 MF$0.65

A STUDY FOR THE SEARCH, RECOVERY AND ANALYSIS OF SPACE FRAGMENTS SEMIANNUAL PROGRESS REPORT, 1 DEC. 1966 - 31 MAY 1967.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
W. P. Hirst. 31 May 67, 5p NASA-CR-85862, SAPR-6
Grant NSG-563

Descriptors: * Moonwatch program, * Orbit decay, * Satellite observation, * Table, Communication, Decay, Distribution, Geography, Mount, Observation, Orbit, Prediction, Satellite, Telescope.

For abstract, see STAR 05 17.
N67-31450 HC$3.00 MF$0.65

* U.S. GOVERNMENT PRINTING OFFICE : 1967 OL—305-087 (5)

REPORT LOCATOR LIST

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*U. S. GOVERNMENT PRINTING OFFICE : 1967 305-087/5

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